# THE ENGINEERING AND MINING JOURNAL

Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. XLIX. MARCH 8. No. 10.

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**Cable Address: "Rothwell, New York."** Use A. B. C. Code, Fourth Edition

**London:** 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.
**Mexico:** Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.
**Peru, S. A.:** Mr. John Newton, No. 2 Calle Constitucion, Calla.
**Australasia:** Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage:
*Weekly Edition* (which includes the Export Edition), for the United States, Mexico and Canada, $4 per annum; $2.25 for six months; all other countries in the Postal Union, $5.
*Monthly Export Edition*, all countries, $2.50 gold value per annum.
REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

**THE SCIENTIFIC PUBLISHING CO., Publishers,**
SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager.
**P.O. Box 1833. 27 Park Place, New York.**


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THE International American Railroad, which has been reported on favorably by the International American Congress now in session at Washington, to extend through Mexico, Central and South America, connecting all the principal cities of these countries, would be an important step toward bringing the United States into closer relations with the rest of America. The engineering and financial difficulties of such a scheme are enormous, but there can be no doubt that it will be undertaken and completed before the world is many years older.

APROPOS of trusts, four curious facts—coincidences, shall we call them?—have to be recorded. During the past year the Salt Union in England raised the price of salt nearly 100 per cent. in some descriptions and largely in all; the export trade in salt from Great Britain fell off about 25 per cent.; the dividend paid by the Salt Union was 10 per cent., instead of 20 per cent. as predicted in the prospectus when the dear public was admitted to a share in the benefits of the Trust. Fourth, the company of BRUNNER, MOND & CO., which controls such large salt interests, that every effort was made, in vain, to secure its adhesion to the trus scheme, has just declared a div.dend of 30 per cent. This last circumstance would seem to point the moral that it is better to remain outside of a trust than to join it.

THE threatened disaster to the mining interests of Colorado, viz: the closing down of the lead producing mines in that State, more especially the champion producer, Henriett and Maid, in consequence of the admission of Mexican fluxing silver ores, has not yet taken place. We are informed that the fortunate owners of the above mentioned mine have just been able to make a contract for the delivery of 150 tons of ore a day for one year to the Pueblo Smelting and Refining Company, on better terms than ever obtained before, in spite of the fact that the importation of fluxing ores from Mexico has been again growing in volume since the check given to it by the Treasury instructions of July last. The true situation is becoming better understood now than at the time of the agitation on the subject, when the ENGINEERING AND MINING JOURNAL almost alone stood out for the right; and we have had representatives of many of the great lead smelting works which had opposed the free entry of Mexican fluxing ores assure us that they now recognize the correctness of our views, admitting that these ores are absolutely essential to maintain the important smelting industry of this country.

IN consequence of somewhat incorrect and exaggerated statements a to the extent of the proved portion of the Witwatersrand gold field in the Transvaal, which from time to time appear in print, we may state on the authority of a prominent mining engineer who has been resident in that district more than seven months, that, taking Johannesburg as a center, a distance of 8 miles east and 12 miles west contains all the really first-class mines. It is not to be supposed that even within this distance all the properties which have been taken up are payable, as there are numerous gaps, where either the "reefs," as the ledges of vein matter are called there, are so faulted that they are not capable of being economically worked, or they are too poor to pay. Outside of the limits above mentioned, these reefs are found intermittently, but they are not yet of really proved value. Within the limits referred to there are being worked mines with a richer average value of ore than anywhere else in the world, excepting the Mount Morgan in Queensland. There is no Main Reef, so often referred to. There are a number of parallel beds of conglomerates and they pinch and widen again and occasionally disappear altogether, and these beds as worked in the different properties cannot yet be correlated, and it is doubtful if any one conglomerate bed can be traced continuously for more than a mile. The greatest depth obtained is still short of 300 feet measured on the incline, and at this depth there does not appear to be any diminution either in the size or value of the beds. The gold, however, as usual below water level, is not free, but is contained in the pyrites. Nobody of course can give an opinion as to the future of these fields, but it is apparently very promising, and, with American mining men, methods and machinery, the monthly output, now between $700,000 and $800,000, would be largely increased.

FROM advanced sheets of the report of the Allouez Mining Company, we are enabled to publish the following summary of the work done and results attained in the year 1889.

Considering some disadvantages under which this company has worked in the past, and chief among which is the exceedingly low percentage of copper in the rock mined, this is, with the exception of the Atlantic, and possibly the Copper Falls, the most economically worked mine in the Lake District, which is about equivalent to saying, in the world. The cost of mining, less than 86 cents per ton, of stamping and concentrating, 42 cents per ton, and a total cost of $1.50 per ton mined and $1.69 per ton milled, is a magnificent record for so hard a rock. The total actual cost of producing and marketing copper was, however, 12·8 cents per pound, and this is above a normal price for the metal—so that unless some reduction can be effected in these very low costs, this report would seem to demonstrate that the Allouez mine, is one of that most dangerous class—"too poor to pay and too rich to let go." There is, however, a prospect of a better result in the future; a large amount of dead work has been done and ground opened, and this will permit of a better selection of rock for the mill; we may, therefore, expect a somewhat higher yield of the rock milled and this will reduce the cost of copper, we hope, below the danger line.

Great credit is certainly due to the officers at the mine, under the lead of Mr. FRED. SMITH, agent, and to Mr. JOHN STANTON, the treasurer of the company, who administers and supervises all its business. Mr. STANTON has been a valuable officer for the Allouez, as those who recollect its former condition must admit.

SUMMARY OF RESULTS FOR THE YEAR 1889.

| | |
|---|---|
| Tons of rock mined | 131,420 |
| Tons of rock hoisted | 126,125 |
| Tons of rock treated at mill | 116,608 |
| Refined copper per ton of rock mined | 13 4/10 lbs. |
| Refined copper per ton of rock milled | 15 1/10 lbs. |
| Total yield of mineral | 2,546,490 lbs. |
| Total yield of refined copper | 1,762,816 lbs. |
| Cost of mining, per ton of rock milled | $0.8578 |
| Cost of hoisting, per ton of rock milled | .1318 |
| Cost of selecting and breaking, per ton of rock milled | .1478 |
| Cost of general surface expenses (less rents), per ton of rock milled | .0532 |
| Cost of transportation to mill, per ton of rock milled | .0520 |
| Cost of stamping and separating, per ton of rock milled | .4188 |
| Cost of expenses on mineral, per ton of rock milled | .0270 |
| Total net working expenses, per ton of rock milled | 1.6884 |
| Total net working expenses, per ton of rock mined | 1.4980 |
| Cost of freight, smelting and marketing product, includ- New York office expenses, per ton of rock milled | .2462 |
| Gross value of product, per ton of rock milled | 1.8268 |
| Cost of copper marketed and all expenses paid, per pound | .1280 |

## LET THE GOVERNMENT HELP EVERYBODY.

The effect of the special legislation and special bounty some of the silver men are asking from Congress is already becoming apparent. The agricultural classes, whose need of public help are greater than those of any others, are putting forward their claims. Senator VANCE has, at the request of the Farmers' Alliance, introduced a bill in Congress which calls for the erection in every county of the United States of a Federal warehouse, in which the owners of agricultural products may deposit the same and receive treasury notes for 80 or 85 per cent. of the market value of these products, the notes to become part of the public currency.

Of course every advocate of the silver warehouse scheme will assert that the agricultural warehouse plan is preposterous, and not much better than the plan proposed some time ago by a Chicago paper that the Government purchase all the whiskey manufactured, and issue therefor legal tender certificates, somewhat in the manner of the proposed silver certificates; and it is claimed for whiskey that, as a basis of currency, it would have the unique advantage of increasing in value with age, thus earning its own interest, and after a certain number of years the Government might sell a portion for the cost of the whole, and would thus make a handsome profit. Yet this proposition no doubt appears very absurd to nearly every one. The Farmers' Alliance consider its plan to have Government warehouses a very serious one. Next we may reasonably expect the lead melters and the copper producers and iron furnaces to ask the Government to endorse their warehouse certificates or to buy their products at some fictitious "market price."

When the government buys what every one produces, and pensions every individual in the nation with the taxes collected from every one, we shall have arrived at BELLAMY'S ideal state, and the government will, of course, then dictate what shall be produced and who shall produce it. We confess the BELLAMY scheme seems to us to be a sensible and practical plan, compared with some of the schemes proposed, and we are accustoming ourselves to "looking forward" to its adoption at an early date if the present craze for government help in every industry and by every individual continues. Before long we may expect every business to draw a bounty in some shape and every individual to get a pension.

## THE NEW LEAD SMELTING COMBINATION.

The lead smelters of the country, outside of those in the white lead trust, are reported to have taken steps looking to a consolidation of nearly all the furnaces in the United States. They are very desirous of having it understood that *their* organization is no trust. What they have done, or what they are proposing to do, appears to be to organize a company called the United States Smelting and Refining Company, with a capital of $25,000,000, divided, it is said, into $15,000,000 of common stock and $10,000,000 of 7 per cent. preferred stock. This capital is intended to cover the purchase of all the lead smelting and refining works in the country, and not merely the works mentioned on another page.

The valuation of the several works was left to MR. ANTON EILERS, who we understand examined the works and books of all the companies, and finally decided upon the percentage of the whole capital each concern was entitled to. His decision, communicated to the party interested only, was accepted by all, which was a very gratifying evidence of the high esteem in which Mr. EILERS is held by his *confreres*.

We understand this great combination, which aims at controlling all the lead smelters outside of those now in the ill-savored "white lead trust," is organized with most virtuous intentions. It is not contemplated that a "fair remuneration" on the capital invested will require the price of lead to be advanced beyond 4 or 4¼ cents a pound, only sufficient to allow the miner a living price, the railroad a fair freight and the smelter a moderate profit (say 20 per cent.) on his investment.

Now every one recognizes that a lead smelting works, like a rolling mill or steel works plant, becomes antiquated in about five years and has to be renewed, so that the profit while running has to cover this large and usually neglected item of depreciation.

Whether the human nature which has wrecked so many virtuous resolves of moderation in the demands of those wielding absolute power may not interfere with the full realization of these good intentions we cannot say, but we "have our doubts." It is true that the lead smelting business of this country of late years has not paid in fair proportion to the risk to the investment involved, and it is no doubt true that in some cases prices paid for silver-lead ores have been greater than their intrinsic value would justify.

The success of this combination, like that of all others, will depend on the degree of prudence and economy with which its affairs are administered. Theoretically it is easy to show—and it is a favorite argument of those who favor trusts and combinations—that concentration of manufacturing permits of making great economies, by cutting down general expenses of management and of sales, by saving in transportation on the raw and manufactured material, and by running only the most economical works, and running those full time which are best situated to supply the market economically. It is easy to point out how economies equal to a very satisfactory dividend on the whole capital can thus be effected without increasing the cost to consumers of lead or lessening the price paid to miners for their ore. Unfortunately practice and theory do not often agree in this matter, and the almost universal practice of combinations which actually monopolize any article is, first, to cut down the price of the raw material they buy; second, to charge more for their own services—*i. e.*, a higher smelting charge—and, third, to charge consumers more for what they produce—that is, a higher price for lead. As the combination can force the railroads to carry for less, and the miners are obliged to take what the only purchaser will give for ore, and as all the expenses of smelting and refining are capable of being largely reduced by a proper distribution of the work, the combination generally makes, for a time, extremely liberal profits.

It is very rarely, however, that we find strict economy practiced either by companies or individuals when there is no necessity for it, and if a monopoly can keep up "fair profits"—itself being the sole judge of what is "fair"—by simply adding a quarter or half a cent a pound on the lead produced (which in this particular case would be equal to from three to six per cent. on the entire capital of the company), it is very difficult to enforce strict economy in the work.

Competition in trade seems necessary to insure economy and improvement in manufacturing, and as monopolies, under whatever name known, are not subjected to this necessary stimulus, they come ultimately with practical unanimity, and, notwithstanding any virtuous resolutions with which they may have started out, to select the easier way of keeping up what they consider "fair profits"—namely, by squeezing the producers of the raw material, on the one hand, and by extorting unreasonably high prices from the consumer on the other—occasionally they squeeze the transportation company, as in the case of the Standard Oil Company. The "white lead trust" is illustrating the squeezing of consumers, having advanced the prices of white lead in a wholly unwarranted manner. The new lead smelters' combination is said to have been formed partly to relieve itself of the oppression of this "white lead trust," which advances the prices of certain ores beyond their actual value, with the view of freezing out the rival smelters, the "trust" being able to recoup from the consumers of white lead the money with which to carry on this "freezing-out" process. The influence of the "trust" upon the pig lead market is considered dangerous also, being by far the largest factor in it. Now the new smelters' combination can put up corroding works of its own and force down the price of white lead, or, which is more probable, some "arrangement" may be made by which the more or less helpless miners will think they find themselves squeezed, whether they are so or not. When they find the price of lead advanced and the price of ore decreased their ill will will go out to both combinations, and efforts will be made to build up new, improved, rival smelters, and the past will be lived over again. This will be the result, unless very great moderation be exercised—and we confess our faith in this contingency is not without serious doubts, for it has, as a foundation, a long and intimate study of the practical working of trade combinations. We hope for the best, or, as the old frontiersman put it, "We trust in God and keep our powder dry."

## NEW PUBLICATIONS.

THE STEAM ENGINE AND THE INDICATOR: Their origin and progressive development, including the most recent examples of steam and gas-motors, together with the indicator, its principles, its utility and its application. By William Barnet Le Van. Illustrated by 205 engravings, chiefly of indicator cards. Philadelphia, Henry Carey Baird & Co. 8vo., 469 pp. Price $4.

The author is one of those well meaning, but unfortunate engineers of the old school, who having spent nearly a lifetime of usefulness in the practical field, thinks himself called on in his later days to write a book. He has felt the usual "long felt want" or, as he expresses it in his preface, "having felt personally the want of more practical information on the subject than is contained in existing works, it has been the aim of the writer to supply such want." Why he should feel such a want does not appear, for he "gladly acknowledges the assistance afforded him by the practical treatises of Main and Brown, Stillman, Porter, Salter, Graham, and others, the engineering periodicals, and above all by the late John W. Nystrom," and these and the hundred other works, both practical and theoretical, on steam engines and the indicator, should have filled the aching void, without the necessity of this author's labor in writing a new book of over 400 pages. We fear the "long felt want" was not a want of information on the subject written about, but simply an ambition to write a book, and so add to his triumphs as a practical engineer the crown of authorship.

He has succeeded not only in writing his book, but in finding a publisher to inflict it on the world, and he is entitled to the credit or discredit of having written one of the worst books on steam that has probably ever issued from the American press. Some years ago Mr. Nystrom, who had previously published a most valuable engineers' pocket book, wrote a book in which he took exception to the definition of the terms force, power, space, work, energy, etc., in universal use among educated engineers and writers on mechanics. He claimed there were three elementary quantities, force, velocity, and time, and that the three quantities, power, space, and work, were functions of these elements. Thus, he contended, space is not an element, but a function; namely, the product of velocity

and time. Mr. Nystrom's views created a little discussion in some technical journals at the time, but they were not accepted by the engineering profession, and were allowed to fall into a deserved oblivion. Mr. Le Van now resurrects them, and gives them a most prominent place in his introduction. How he makes use of these discarded definitions may be seen in the following sentence:

"If the temperature of the heat represents force, then the space occupied by the heat must evidently represent the product of velocity and time." We doubt if Dr. Tyndall himself would recognize this paraphrase of "heat is a mode of motion."

Chapter II. is headed, "Who Invented the Steam Engine?" Its opening paragraph will give a clear idea of the author's dignified and classical method of handling the Queen's English. "If, like Topsy, any invention 'wasn't born,' but 'growed,' it is that of the steam engine. Go, reader, to the Franklin Institute of Philadelphia, and ask for Mr. Bennet Woodcroft's translated edition, now out of print, of Hero's book of A. M., 3804, or, say, the year 200 B. C."

Another gem is found on page 41: "Many men of genius fill obscure graves, in whose souls the living fire of poetry, or the bright sparks of genius, lay hidden and lost, merely wanting opportunity or fortuitous circumstances to have enabled them to shed a lustre over their race. And in some retired spot may remain the mortal tenement from which the soul of an Arkwright, a Davy, a Watt, an Evans or a Webster may have fled, which merely wanted education and opportunities for its development." We never before saw Gray's elegy brought into technical literature.

Chapter III. is devoted to Heat and Work and Chapter IV. to Expansion, and in these there is nothing which has not been said in a better way by numerous other writers. Then follow about two hundred pages of matter on indicator diagrams, action of steam in the engine, steam jackets, varieties of engines, etc., much of which is very good, some indifferent, and some very bad, but the whole is thrown together in a most disconnected and illogical manner. It appears that the author has dashed off from his fluent pen, page after page, in the rambling style of those who are unaccustomed to exact reasoning, and careful writing, and has sent them to the printer one by one as written, instead of finishing the manuscript first and then revising it before printing. The result of this slipshod authorship has led to some most absurd and amusing repetitions. Thus, on page 242, under the heading "Automatic Steam Engines," he says, "The fundamental idea upon which this class of engines are designed is that of variable expansion," and discusses these engines at some length.

Two pages further on he treats of the economy of using steam expansively, and then on page 247 appears the heading Automatic Expansion Engines, which begins with the identical words above quoted, and the next half page is almost a verbal repetition of page 242. This is bad enough, but we can only be amazed at the carelessness of author, publisher, printer, proofreader and office boy, and whoever else had anything to do with the book, to find an page 249, under a new heading "Automatic Cut-off Engines," the "Fundamental Idea" and a half page of matter again repeated word for word.

In Chapter XIV. the author gives about forty pages, relating to gas engines, including a brief history and a description without illustrations of several styles, such as the Otto, the Clerk, the Atkinson, etc., and he predicts that the time will come when factories, railways and ships will be driven by gas engines as efficiently as by any steam engine.

After thus interjecting a chapter on gas engines, the steam engine is returned to, and Chapter XV. is devoted to "Automatic Cut-off vs. Positive Cut-off."

Chapter XVI. and an appendix contain miscellaneous information which was apparently put in as an after-thought. Thus early in the volume the author tells us that the best forms of indicator are so well known and described in the circulars of their respective manufacturers that he will not repeat them, but in the appendix they are all described and illustrated, perhaps as advertisements.

A few pages are devoted to incrustation of boilers and to a puff of a "boiler compound," the composition of which is kept secret. The horizontal flue boiler, with a steam drum connected by a single neck, and having the products of combustion passing all around it, is said to be "no doubt the best boiler that can be erected, considering all conditions;" and not satified with this extravagant statement, it is stated further that water-tube boilers require 33 per cent. more power to develop a horse power than the horizontal flue boilers require. This statement is made on the strength of a test at the Brush Electric Light Company in Philadelphia, where it was found that the flue boilers developed a horse power for every 9·4 square feet of heating surface, whereas the water-tube boilers developed a horse power for every 14·1 square feet. No one knows better than Mr. Le Van himself (for he was present at the test referred to, as shown in the report of it made by the late John C. Hoadley and published in *Van Nostrand's Magazine*), that at this test the water-tube boilers showed an economy of seven per cent. of fuel over the horizontal tubular boilers, which increased economy was due to the very fact that the water-tube boilers had a more liberal allowance of heating surface for a horse power. So the author adds to the offense of writing a very bad book on steam the graver offense of suppressing information in the interest of one type of boiler over another. On the whole, the book is discreditable, and it were better that it had never been allowed to see the light of day.

**Coal Production of France.**—The Mines Department of the French Ministry of Public Works has published particulars as to the production of coal last year, the figures showing that the total output was 24,588,880 tons, or 1,985,986 tons more than in 1888, and 3,300,000 tons more than in 1887. The increase would have been still larger but for the strikes which occurred during the past year in the basins of the Pas-de-Calais and the Nord, which produced 13,456,000 tons last year, or more than half of the whole of France. This represents, despite the strikes, an increase of over a million tons upon 1888, while it is of interest for English coalowners to mark that, despite the iron crisis in the southern departments of the Gard, the Tarn, the Aveyron, and the Hirault, the output of coal has increased from three to three and a half million tons, a great effort being made by the southern companies to increase their sphere of action and supply the Mediterranean ports, which have hitherto been provided chiefly with English coal.

## CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

### Leaching Silver Ores in Honduras.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR—For this particular instance of "rushing into print," your correspondent and my friend, Mr. Louis Janin., Jr, must bear a part of the blame—it being instigated mainly by the perusal of his interesting article in your issue of January 18th on the ores of the Ontario mine. Such articles are instructive, like those of Ottokar Hofmann on the ores of the San Francisco del Oro mine, and the exchange of facts as well as opinions is advantageous all around.

In the first place, I must thank Mr. Janin for having done me the justice to credit me with being the first to point out the difference between solubility and chloridation.* Being so long familiar with that difference, if I had met with the circumstances described, I should probably have commenced my investigations where Mr. Janin ended his, by ascertaining the percentage of actual chloridation, and seeking to improve it. Certainly I should never attribute the difficulty to the presence of base metals in the quicksilver, for, however injurious that may be in amalgamation of *metallic* gold, I am convinced that it is a positive advantage in the treatment of a silver compound such as Ag Cl.

But facts, unless backed by some great name, are apt to make their way slowly, and there are, no doubt, many metallurgists who never saw, and others who never believed or never considered, my assertion, in 1876, that a determination of the percentage of the silver which hypo will extract from roasted ore is not necessarily a chloridation assay. In some cases, as here, the matter has little practical significance, because that portion of the soluble silver which is not chloride, is, nevertheless, amalgamable, though more slowly than the chloride; but in other cases, as with Mr. Janin, it is quite important, and it has doubtless lent a feather or two to the plumage of the Russell process. I must here remark that I do not understand Mr. Janin's "solubility per cent." and "chlorination per cent." in his last table. It may be that my brain is somewhat clouded just now by "calentura" and quinine; but according to my understanding of the terms, solubility always includes and may be greater than chloridation; it cannot be less. But in this table it seems to be a thing apart, since the sum of the two sometimes exceeds 100, and the difference has no designation or function. What, in this table, is "solubility per cent.?"

As to the proportion of salt required, I have the idea, which Mr. Janin's article strengthens, that the minimum, *cæteris paribus*, is when a suitable proportion of sulphur is present; that while an excess of sulphurets may tend to increase the consumption of salt, perhaps by its premature decomposition, the evolution of chlorine in sufficient volume by other agencies, such as that of silica, for instance, requires that the mass shall be saturated with salt in a state of fusion or in a state of vapor. At this mine, Santa Lucia, the lowest grade of ore treated required 10 per cent. of sea salt (80 per cent. NaCl) in the state in which it comes, somewhat dirty and quite moist; while ore that is three times as rich in silver, lead, zinc and sulphur did not seem to be benefited by over 15 per cent.

Perhaps it is on the same principle that, while one man can discover an army of a thousand men with ease, the thousand men may be quite unable to find the one.

These ores had until recently quite a reputation for successful rebellion against the coercion acts of their persecutors, though they have since been brought at least within the bounds of moderate kicking. One (now, happily for the company, *ex*-) superintendent offered to bet $1,000 that the ore from a certain drift could not be chloridized. Of a sample of nine tons of that same ore I give myanalysis, which, though made under some disadvantages, is correct in the main, or as nearly so as need be:

| | | | |
|---|---|---|---|
| Lead | 5·12 per cent. | Magnesia | 2·54 per cent. |
| Copper | 0·35 " " | Silver | 0·30 " " |
| Zinc | 7·25 " " | Carbon dioxide | 12·80 " " |
| Silica | 29·00 " " | Alumina | 6·03 " " |
| Sulphur | 5·54 " " | Loss, etc. | 3 31 " " |
| Lime (CaO) | 20·20 " " | | |
| Iron ($Fe_2O_3$) | 5·29 " " | | 100.00 " " |
| Oxygen | 2 27 " " | | |

The ore contained a trace of antimony; a very little of the lime was gypsum, and a very little of the lead carbonate; pyrites, if present, amounted only to a trace. The silica proved to be more than I expected, but a considerable part of it was combined as slate, talc, a brown, ferruginous stone, and also clay.

This lot was devoted to experiment; it was crushed with 2 per cent. of salt (80 per cent. pure), and passed, under low heat, through the Thompson-White furnace. A portion of it was then repassed through the furnace under a higher heat with the addition of 5 per cent. of salt; this gave a solubility of 84 per cent. of the silver contained. The remainder of the once roasted ore was reroasted with 10 per cent. additional salt; in this portion 91 per cent. of the silver was soluble in hypo. And this was the ore which could not be chloridized above 60 per cent. by a man who, I was told, was a good mill-man, and whom I knew to be a good sign-painter.

Mr. E. N. Riotte was down here for a month, a year or more ago; he succeeded (of course) in treating the ore, and gave some advice, a part of which, as to increasing the capacity of the mill, was partly acted on, but his best suggestion, as to the proper use of the plant on hand, seems to have been ignored.

But "while the lamp holds out," etc.; I believe the Sta. Lucia Mining and Milling Company, than which as a whole no more honorable or deserving ever entered the mining field, will see good times yet.

Owing to local management, which I will mildly characterize as inexplicable, the supply of available ore failed last fall and the mill was stopped. I say available ore, because several bodies of good rock were then known to exist which could not well be got at until attacked from a lower level, and a tunnel which might have served the purpose was al-

*Analogue, oxidation; chlorination being the simple impregnation with chlorine, regardless of chemical combination. It is a pity we cannot adopt a uniform nomenclature.

lowed to cave, as were also several straggling tunnels which had been run for other veins on the property. The pine timber used until recently has rotted and has been, or will shortly be, all replaced by oak.

Thus far all of the useful work and extraction of ore has been in the vein called "El Ternero" (the Calf), and in the third level it is now looking better than ever, showing a body of good ore for over 200 feet in length, the vertical extent not yet proved beyond 20 feet above the drift, where it is still good and likely to extend much higher, as there is plenty of back.

The extension of this drift will pass under or into the ore bodies, known to exist below the upper level, which will then be conveniently extracted.

Following is a rather rough analysis of a sample of the rich class of ore from this lower tunnel:

| | Per cent. | | Per cent. |
|---|---|---|---|
| Silica | 18·60 | Lime | 4·20 |
| Sulphur | 14·50 | Magnesia | 1·70 |
| Zinc | 13·90 | Silver | 1·02 |
| Iron | 3·50 | Carbon dioxide | 5·50 |
| Alumina | 0·60 | | |
| Copper | 1·27 | Total | 98 08 |
| Lead | 33·29 | | |

This is a smelting ore, but as there is not much of it, we mix it with a lower grade for the roasting.

The mining interest is looking up in this country. The Rosario company's mill is to start very soon; the Victorina mine, in Curaren, is developing well and the ten-stamp mill is working and, I believe, paying. The mines in the Valley of Angels are maintaining a steady, though not large output of silver, which is sold to the government. The two mills in Yuscaran are working. The Santa Lucia company will not be non-producer much longer; the Victoria company, near here, will soon be ready to make an experimental run. Several other companies are steadily developing their properties.

La grippe has not yet made its appearance, and I don't think it can do much business down here. By the way, I tried the Macarthur Forrest process on these ores—results unfit for publication. I was not surprised to learn that it is an old thing; in fact, I've tried it before myself.

HONDURAS, February, 1890. C. H. AARON.

## PROPOSED COMBINATION OF SMELTERS.

An Associated Press dispatch from Chicago made the following announcement on Monday last:

The big smelting organizations of the United States have formed a trust, with a capital of $25,000,000. That is the substance of a report which was made public here to-day. Last November it was rumored that such a pool would be formed; now it is said to be an established fact. The following smelting and refining companies, which, it is said, includes all but five in the United States, are reported to be in the combine:

The Omaha and Grant Smelting and Refining Company of Omaha, the Kansas City Smelting and Refining Company of Kansas City, the Pennsylvania Lead Company of Mansfield, Penn.; the Chicago Smelting and Refining Company of Chicago, the Aurora Smelting and Refining Company of Aurora, Ill.; Messrs. E. Belback & Co. of Newark, N. J.; the Globe Smelting and Refining Company of Denver, the Pueblo Smelting and Refining Company of Pueblo, Col.; the Colorado Smelting Company of Pueblo, the Philadelphia Smelting and Refining Company of Pueblo, Col.; the Arkansas Valley Smelting Company of Louisville, the Manville Company of Leadville, the San Juan Smelting Company of Durango, Col.; the Hanover Smelter of Salt Lake City, the Mingo Furnace Company of Salt Lake City, the Germania Company of Salt Lake City, the Helena and Livingston Smelting and Refining Company of Helena, Mont.; the Montana Smelting Company of Great Falls, Mont., and the El Paso Smelter of El Paso, Texas.

On Nov. 30, 1889, the representatives of six smelting and refining companies met in the Millard Hotel at Omaha, by special arrangement. The companies represented were the Omaha and Grant Smelting and Refining Company, the Kansas City Consolidated Smelting and Refining Company, the Philadelphia Smelting and Refining Company of Pueblo, and three others. Guy Barton of the Omaha and Grant was elected president, and Mr. Geist of the Philadelphia, secretary. The object of the meeting was stated to be for the purpose of devising some way of protecting the lead smelters from the Lead Trust. It seemed to be the sense of the meeting that if all the lead smelters would organize into a trust or combination they might be able to secure protection for themselves and the producers of all kinds of ores.

Various ways of organizing were discussed, but no definite action was taken at this meeting. It was shown by figures that the organization of the proposed pool or trust would make a profit for the members of about $4,000,000 annually or something like 40 per cent. on the capital invested. Before the meeting adjourned it was thought best to secure, in confidence, from the different companies the value of their property to be reported at the next meeting. The work was put in the hands of Mr. Ellers.

On February 13th the next meeting took place at the Palmer House, Chicago. It was decided to organize a company composed of all the smelters named, which should be called the United States Smelting and Refining Company. The capital stock agreed upon for the trust was $25,000,000, of which $15,000,000 is to be common, and the remaining $10,000,000 preferred. The common stock is to be used for the payment of the fixed properties that go into the new organization, and the preferred stock for the purchase of ore and such personal property as it may be necessary to have. The preferred stock is to bear 7 per cent. interest, and to be redeemable in 8, 10, 12, or 20 years. The redeemable prices fixed for 8 years is 112, 10 years 110, 12 years 108, and 20 years par.

It was also decided to found a sinking fund, and for this purpose it was agreed that for the first two years $250,000 of the profits should be laid by annually and that each year thereafter an even half million should be added to the fund. It was arranged that the actual formation of this company would not take place until three-quarters of the preferred stock had been taken. It is now asserted that the necessary stock has been subscribed and that the final articles of incorporation will be filed in the several States and Territories within a short time. The chief object of the smelters, it is said, is to place their interests beyond the absolute control of the Lead Trust.

## THE PROPERTIES OF ALUMINUM, WITH SOME INFORMATION RELATING TO THE METAL.*

By Alfred E. Hunt, Jno. W. Langley and Chas. M. Hall.

### PURITY OF ALUMINUM.

A great deal that has been written heretofore about the properties of aluminum is of doubtful value, owing to the lack of knowledge we have of the purity of the aluminum referred to.

Much of the metal heretofore sold in the markets as pure aluminum has been contaminated with from four to ten per cent. of impurities. Indeed, it is only within a very few years that a purer metal than 95 per cent. aluminum has been made upon any larger than a laboratory scale.

The works of M. Pechinet, of the Société Anonyme d'Aluminum, at Salindres, near Marseilles, in France, have longest enjoyed the reputation of making the purest aluminum placed upon the market. The method employed is essentially Deville's, reducing aluminum chloride by aid of metallic sodium, the same as practiced by the Aluminum Company, Limited, at Oldbury, in England, and also with the modification of using aluminum fluoride, instead of aluminum chloride, to be reduced by the sodium, by the Alliance Aluminum Company, of Wallsend-on-Tyne, in England.

The Pittsburg Reduction Company, manufacturing under the Hall process, reduces the metal from aluminum oxide, alumina ($Al_2O_3$), by electrolysis; this alumina being held in solution by a molten fluoride bath, which, itself, is not decomposed by the electric current, which is conveyed to the melted solution by means of carbon cylinders placed in the bath for positive electrodes, a carbon-lined pot forming the negative electrode. The oxygen of the aluminum goes off at the positive electrode as carbonic acid, wearing away the carbon at the rate of nearly a pound of carbon to the pound of aluminum produced. The reduced metal settles to the bottom of the pot, from which it is easily tapped or ladled off, practically free from the electrolyte, a second re-melting entirely purifying from it.

All of these four concerns have succeeded in making aluminum of over 99 per cent. purity, although it is only with careful selection of materials and the greatest care to prevent contaminations that metal of this purity is obtained by any of them, and all of them have succeeded in regularly placing upon the market metal in considerable quantities, of over 98 per cent. purity; and these are the only concerns who have done so, so far as has reached the knowledge of the writers.

The impurities of the metal made by "The Sodium Process," as practiced by the first three, have been nearly half iron and half silicon. With the Pittsburg Reduction Company the impurity consists almost entirely of silicon, the iron being less than ten-hundreths of one per cent.

In the first three-quarters of the month of December, 1889 (the plant was shut down for repairs, the first time since November 28, 1888, from the day before Christmas until New Year) 1,250 pounds of aluminum was made by the Pittsburg Reduction Company, all of which was over 98·25 per cent. aluminum, with less than 0·10 per cent. iron, and with about 1·50 per cent. silicon; and quite an amount of this metal was over 98·75 per cent. aluminum.

The singular fact is that quite a portion of the silicon in aluminum exists in the graphitoidal state. This was pointed out by Mr. H. J. Williams, when chemist of the Pittsburg Reduction Company, in Transactions, Vol. XVII., page 542, and also as recognized by Deville in his researches.

In aluminum containing 6·20 per cent. silicon, made by the Alliance Aluminum Company, Limited, we have found 3·85 per cent of graphitoidal silicon. In a sample of aluminum made by the Pittsburg Reduction Company, using calcined native bauxite as an ore, containing 5·30 per cent. silicon, 2·40 per cent. existed in the graphitoidal state.

This graphitoidal silicon can readily be separated by dissolving the metal in diluted hydrochloric acid, adding enough bromine water to keep the solution well oxidized and to prevent loss as silicuretted hydrogen.

Boron if added to aluminum is found to similarly exist in the metal in the dual form of graphite and diamantine boron (Deville).

The following table gives the average composition of the metal of the various makers, of given percentages of contained aluminum, as shown by many analyses made by the Pittsburg Testing Laboratory:

| Aluminum metal made by | Per cent. aluminum. | Per cent. combined silicon. | Per cent. graphitodial silicon. | Per cent. iron. | Per cent. copper. | Per cent. sodium. | Per cent. lead. |
|---|---|---|---|---|---|---|---|
| The Pittsburg Reduction Co. | 95·0 | 1·50 | 1·35 | 2·00 | 0·07 | 0·04 | 0·03 |
| The Société Anonyme Aluminum | " | 0·90 | 1·00 | 3·00 | 0·05 | 0·01 | 0·04 |
| The Alliance Aluminum Co., Ltd. | " | 0·90 | 0·75 | 3·25 | 0·02 | 0·07 | 0·01 |
| The Aluminum Co, Ltd., Newhausen | " | 1·75 | 1·15 | 2·00 | 0·01 | 0·07 | nil. |
| " " " " | 94·15 | 1·02 | 0·54 | 2·80 | 1·45 | ... | .. |
| The Pittsburg Reduction Co. | 97·0 | 1·55 | 1·25 | 0·13 | 0·03 | 0·02 | 0·62 |
| The Société Anonyme d'Aluminum | " | 0 90 | 0·82 | 1·20 | 0·04 | 0·01 | 0·03 |
| The Alliance Aluminum Co., Ltd. | " | 0·95 | 0·53 | 1·45 | 0·01 | 0·05 | 0·01 |
| The Aluminum Co., Ltd. | " | 0·75 | 0·52 | 1·55 | 0·03 | 0·15 | nil. |
| The Pittsburg Reduction Co. | 98·0 | 1·30 | 0·60 | 0·07 | 0·01 | 0·01 | 0·01 |
| The Société Anonyme d'Aluminum | " | 0·71 | 0·35 | 0·90 | 0·01 | 0·01 | 0·02 |
| The Alliance Aluminum Co., Ltd. | " | 0·90 | 0·29 | 0·75 | 0·01 | 0·04 | 0·01 |
| The Aluminum Co., Ltd. | " | 0·90 | 0·23 | 0·80 | 0·02 | 0·05 | nil. |
| The Pittsburg Reduction Co. | 98·52 | 0·42 | 0·72 | 0·05 | 0·06 | nil. | 0·04 |
| " " | 99·0 | 0·80 | 0·15 | 0 03 | 0·01 | nil. | 0·01 |
| The Société Anonyme d'Aluminum | " | 0·35 | 0·13 | 0·50 | nil. | 0·01 | 0·08 |
| The Alliance Aluminum Co., Ltd. | " | 0·31 | 0·20 | 0·45 | nil. | 0·03 | 0·01 |
| The Aluminum Co., Ltd. | " | 0·27 | 0·15 | 0·55 | 0·02 | 0·01 | nil. |
| The Pittsburg Reduction Co. | 99·2 | 0·41 | 0·34 | 0·05 | nil. | nil. | nil. |
| The Alliance Aluminum Co., Ltd. | 99·14 | 0·23 | 0·17 | 0·46 | nil. | nil. | nil. |
| The Pittsburg Reduction Co. | 99·34 | .... | .... | 0·05 | nil. | nil. | nil. |
| The Aluminum Co., Ltd | 95·0 | 0·85 | 0·75 | 3·00 | 0·10 | 0·30 | nil. |

### PROPERTIES WITH REFERENCE TO SPECIFIC GRAVITY.

One of the most striking properties of aluminum is its lightness, which,

* Paper read at Washington Meeting of American Institute of Mining Engineers, February, 1890.

for many purposes, makes it comparable in value with metals costing one-fourth as much.

The following table of specific gravities of aluminum, with authorities, is given:

| Quality, make and condition of aluminum. | Specific gravity compared with water at 4°c. | Authority. |
|---|---|---|
| Cast metal | 2·56 | Roscoe & Schoelemmer. |
| Hammered metal | 2·67 | " " |
| Cast metal | 2·60 | Guattiers Metallic Alloys. |
| Heated to 100°c and cooled | 2 65 | Richards aluminum. |
| Cast metal absolutely pure at 4°c | 2·60 | Deville. |
| " " " " | 2·583 | Mallet. |
| Samples sawed out of centre cast ingot ¾ in. × 6 in. × 12 in. | 2·587 | The Pittsburg Testing Laboratory. |
| Same, annealed | 2·692 | " " " |
| Aluminum casting 92·87% al$_2$, 4·05% Fe | 2·807 | " " " |
| Aluminum rolled bar 2 in. × 1 in. × ¼ in. al $_2$, 98·0 Fe° 45% 3·38% Si | 2·761 | " " " |
| Average lot 98·52%, aluminum 3 P. R. A. Si 1-51% | 2·610 | " " " |
| Average lot 98·52%, Aluminum sheet, .0625 thick casting | 2·710 | " " " |
| Average lot 98.25%, Aluminum casting ¾ in. thick | 2·587 | John D. Langley. |
| Average lot 98· 52%, Aluminum rod | 2 703 | " " |

The specific gravity of aluminum being taken as one, soft steel is nearly 2·95 times as heavy, copper 3·6 times as heavy, ordinary high brass 3·45 times as heavy, nickel 3·5 times as heavy, silver 4 times as heavy, lead 4·8 times as heavy, gold 7·7 times as heavy.

A sheet of aluminum 12 inches square and one inch thick weighs 14·03 pounds; a bar of aluminum one inch square and 12 inches long will weigh 1·17 pounds. A bar of aluminum one inch in diameter and 12 inches long will weigh 0·918 pounds.

A cubic inch of cast aluminum weighs 0·092 pounds.

A cubic foot of cast aluminum weighs 158·967 pounds.

A cubic foot of soft steel weighs 490·450 pounds.

A cubic foot of wrought iron weighs 485·874 pounds.

A cubic foot of copper weighs 554·988 pounds.

A cubic foot of ordinary brass weighs 524·160 pounds.

Aluminum has about the tensile strength of cast iron, with only about one-third of its weight, and casts equally as easily and successfully, and will therefore be very advantageously used to replace cast iron in the parts of moving machinery that have to be reversed or otherwise have their momentum overcome; for with one-third the weight, and consequently one-third the momentum, aluminum will work very satisfactorily.

ACTION OF HEAT.

Pure aluminum melts and becomes fluid at about 1,200 degrees Fahrenheit. The amount of impurity in aluminum materially alters its melting point. One per cent. of iron raises the melting point over 100 degrees. It does not remain firm like lead almost to the fluid point and then suddenly give way, but has a stage of from 1,000 degrees Fahrenheit to 1,200 degrees Fahrenheit, in which the metal becomes pasty, loses much of its power of cohesion, and during which stage, if the metal be gently pressed together, it can be readily welded. It is, however, very red-short at this temperature, and will not stand hammering to weld the metal without crumbling down. If the metal is not held too long a time in this pasty condition it does not seem to become injured after being again cooled down.

The Thomson Electric Welding Company has no difficulty in satisfactorily, rapidly, and cheaply welding aluminum in such ways that the welded strip will break in the body of the bar, by their admirable machines, which are so designed that the surfaces to be welded are brought together at the welding temperature (near that of fusion with many metals, and at the temperature at which the rigidity is almost entirely lost in them all), automatically, in just such a way that the welded faces will cohere without changing the form of the constituent parts.

The melting point of aluminum as given by Roscoe & Schorlemmer, and by Mierzinski, is 700 degress C., or 1,292 degrees F.; by Deville, at a temperature higher than zinc and lower than silver; by Farquhar, at 760 degrees C., or 1,400 degrees F.

Mallet says pure aluminum is more infusible than impure.

The metal of the Pittsburg Reduction Company has been subjected to many tests, which will be referred to later in this article, and for the sake of brevity in identifying it we shall call it the Pittsburg Reduction Company "Average Lot 98.52 per cent. aluminum."

The metal was of the following analysis:

| | Per cent. | | Per cent. |
|---|---|---|---|
| Aluminum | 98·52 | Arsenic | None. |
| Silicon, combined | 0·42 | Sulphur | None. |
| Silicon, graphitic | 0·72 | Phosphorus | None. |
| Iron | 0·05 | Calcium | Trace. |
| Copper | 0·06 | Sodium | Trace. |
| Lead | 0·01 | | |

Aluminum, in a compact mass, is an absolutely "fixed" metal, at any temperature attainable by combustion of carbon in the most approved furnace, although in thin beaten foil aluminum burns in a current of oxygen gas. An experiment, made by one of the authors, of heating a weighed amount of aluminum in a carbon-lined crucible for several hours in a Sefström furnace, at a temperature considerably above the melting point of steel, showed that the resulting buttons of aluminum contained all the original aluminum melted, plus several per cent. of carbon, which formed a tenacious, closely adhering skin upon it. The metal, however, had become quite brittle and had largely lost its cohesive powers. Deville, Watts and Fremy, all say that aluminum is absolutely fixed at all temperatures and loses no part of its weight when highly heated.

Aluminum remains in a molten condition without any slag over it, and requires no flux—indeed, most fluxes are absolutely injurious in that they assist the metal in absorbing silicon and iron from the lining walls of the containing crucible; charcoal, and other light substances which are sometimes used to cover the molten bath, are very difficult to keep from contaminating the castings, and are of no use whatever.

Molten aluminum takes a very thin coating of oxide of aluminum on its surface, which seems to protect the liquid metal underneath it. This thin coating can be discovered by drawing a rod of aluminum across the surface of the bath and noting the brighted surface of the metal in the stroke made by the rod parting the surface film.

It is not our experience that this film of oxide is of serious consequence in preventing sound castings, or causing flaws in rolled sheets or bars.

Aluminum is best melted in first quality plumbago crucibles, from which it absorbs only about 0·25 per cent. silicon with each re-melting.

In melting in clay, Battersea or other silicious crucibles, aluminum becomes very seriously contaminated with silicon.

For purposes where it is especially desirable to retain the purity of aluminum, it is best to re-melt in crucibles brasqued or lined with a mixture of of finely-ground "dead burned," calcined, pure magnesia, with just enough boiled tar to give it sufficient plasticity, this mixture entirely preventing the molten aluminum from coming in contact with the silica in the clay of the crucible walls.

Heated in an atmosphere of chlorine gas, aluminum burns to a chloride. Moist chlorine gas, even in the cold, acts energetically upon aluminum.

Aluminum is most malleable at a temperature between 200 and 300 degrees Fahrenheit, although it can be rolled cold, with frequent annealing.

It should not be worked at a temperature above 400 degrees Fahrenheit, for it becomes very red-short at a temperature a little above this point. Aluminum becomes quite hard by work upon it, either cold-rolling, hammering, or drawing. Through wire dies it assumes nearly double its normal tensile strength, although it does not, like steel, lose proportionately as much of its "ductility" as measured by the flow of the metal in reduction of area at point of fracture. In rolling or drawing aluminum, like the precious metals, it requires frequent annealings to prevent its cracking.

This annealing is accomplished by heating the metal to a temperature of about 800 degrees F. It is a temperature at which a thin bar of iron placed in the muffle will just appear slightly red on a dark day or at twilight. The aluminum at this temperature should not appear at all red. This temperature can best be determined in a practical way by drawing a soft pine stick across the surface of the aluminum to be annealed; it should leave a mark from the charring of the wood, which should burn off very slowly or not at all.

After being heated to this temperature, the metal should be allowed to cool off very gradually; although a very satisfactory annealing of light articles can be attained by plunging them in water of between 60 and 100 degrees F.

For some articles where it is necessary to keep the heat down below the point where the metal would sag or lose its shape, a very satisfactory annealing can be done by heating the articles in boiling linseed oil and allowing them to gradually cool with the oil.

Very thin sheets and wire can be annealed by plunging into boiling water and allowing to cool with the water.

Aluminum, as annealed, is very soft and pliable indeed, in fact, as compared to its tenacity, it is probably the most pliable of metals.

Aluminum on slowly cooling from fusion crystallizes in octohedrons, and castings on fracture show a fine-grained crystalline structure. Pulled in a testing machine, the fracture shows granular.

An ingot of aluminum high in silicon, was melted in a plumbago crucible, and one portion cooled in a very cold and thick-walled ingot mold, into a very thin ingot, in a way to give the metal as much of a chill as possible; the other portion of the metal was cast in a hot mold and into a thin ingot. The metal of the outside of each ingot was analyzed, with the following results:

| | Metal Chilled Rapidly. | Metal Cooled Slowly. | Original Metal as first made. |
|---|---|---|---|
| Aluminum | 96.55 per cent. | 96 52 per cent. | 96.60 per cent. |
| Iron | 0·24 " | 0·24 " | 0·24 " |
| Combined or amorphous silicon | 1·08 " | 1·34 " | 1·24 " |
| Graphitic silicon | 3·13 " | 1·90 " | 1·92 " |

So far as it will be fair to generalize from this single experiment, graphitoidal silicon[1] is not rendered amorphous, or combined, as would be the case in chilled iron under the same circumstances. To support this view, no appreciable difference in hardness can be determined between surfaces of ingots cast in chills and of those cast in hot molds.

The specific heat of aluminum is 0·2143, water being taken as 1.000. As given in Richards on "Aluminum":

Mallet gives the specific heat of aluminum as 0·2253.

Fremy gives the specific heat of aluminum as 0·2181.

Aluminum follows the general rule of specific heats—that they are inversely as the atomic weights.

Aluminum expands under heat.

The coefficient of linear expansion, as determined by one of the authors of this paper, of rolled rods of aluminum of the average lot of the Pittsburg Reduction Company, 98·52 per cent. aluminum, we find is approximately per degree centigrade between the freezing and boiling points of water ·0000206, that of wrought iron by the same method being ·0000122. From this it is apparent that aluminum has a coefficient of expansion closely approaching that of tin, which is ·0000217, and higher than that of copper, which is ·000017182.

Sound castings can readily be made of aluminum, using dry sand molds. The molds can be advantageously lined with plumbago. The metal should be poured quickly, and at very little above the melting point; otherwise the castings will be unsound. Molten aluminum flows readily, and not much larger gates are needed than with brass.

The shrinkage of average aluminum castings made by the Pittsburg Reduction Company is about $0\frac{17}{64}$ inch to the foot, as measured by an Olsen's shrinkage testing machine. The shrinkage can be reckoned to be about 2·26 per cent. of the length of the mold, ordinarily.

[TO BE CONTINUED.]

## ELECTRO-CHEMICAL MOTIVE POWER.

Mr. Jablochkoff recently read a paper before the Société des Ingénieurs civils on the subject of the production of motive power from electricity. Mr. Jablochkoff has long been an advocate of galvanic electricity, and although chemical reactions were the first means of obtaining electricity he does not consider it a retrograde movement to return to this mode of production, but, on the contrary, as a step in advance. He considers that the production of electricity from motive power has been a palliative, a happy one, but only a palliative. The lecturer went on to say that the real production of electricity has its source in chemical means. In dynamo machines the initial power is due to the combustion of fuel, which is a chemical combination, but the utilization of which, in a good engine, does not exceed 10 per cent. Whereas only 10 per cent. of the theoretical efficiency is obtained in the shape of power, as much as 90 and even 100 per cent. electrical calories can be obtained under favorable conditions in electro-chemical combinations. It is true that, in the latter case, the fuels used, which are metals such as zinc, sodium, cast iron, are dearer than the fuel consumed in steam engines, but the efficiency is at once 90 per cent., which affords a large compensation for the discrepancy. If, for instance, we consider the case of cast iron, a useful horse-power hour will consume 750 grammes, and the said consumption may be brought down to 500 and even 400 grammes. As cast iron costs 40 francs. per ton the expenditure per horse-power hour will amount to 3 centimes (a little over a farthing). If to this is added the cost of the sulphuric or hydrochloric acid necessary to oxidize the metal, or about 1 kilogramme of acid per kilogramme of cast iron, the cost of the useful horse-power hour amounts to 9 to 12 cents (2 centimes), which cost is about equal to that of the production of electricity by means of dynamos driven by engines of 15 to 25 horse-power. Moreover, when powerful engines are used for the production of electricity, shafting and belting have to be used, and the stoppage of a number of dynamos does not result in a corresponding reduction of the motive power expended. When electricity is used as motive power there is scarcely, according to the lecturer, any advantage in substituting the power obtained from dynamos to that deriving directly from the steam engine; but the same does not apply in the case of the current being produced by chemical means; this he attempts to demonstrate experimentally, when the figures he uses give rise to objections. The upshot of Mr. Jablochkoff's lecture is the utilization of local currents and polarization in batteries, instead of their elimination. To this effect he uses a three-electrode battery, one being a metal capable of being consumed, the other an unoxidizable metal, such as platinum, and the third a porous carbon. On closing the circuit of the two metal electrodes a powerful polarization is obtained which soon stops the chemical action. When the couple thus formed, and the third electrode are joined, a powerful current will be developed, so that the two first electrodes act as an accumulator, and the three together as a battery. When the battery is at rest it stores electrical energy, and the battery does not consume in open circuit.—*Iron.*

## THE MINERAL RESOURCES OF JOPLIN, MO.

Connected with the main cities of the country through the five railroad lines, St. Louis & San Francisco, Missouri Pacific, Kansas City, Fort Smith, and Southern, the city of Joplin, whose population is 30,000, enjoys all the advantages of civilization and prosperity accessible to a young town. Factories, business establishments, newspapers, hotels, churches, banks, schools, etc., etc., have all risen in consequence of the discovery and development of the mines dotted all over Jasper County, on the southern and western slope of the Moon range of the Ozark mountains, in southwestern Missouri, and bordering on Kansas.

In August, 1870, I. B. Sergeant and E. R. Moffet prospected the district, which then was a wilderness, or farmland at best. They found galena in large quantities to a depth of 25 feet, and were, owing to the absence of transportation facilities, forced to smelt the crude ore in reverberatory furnaces on the spot, of which they ran four in 1871. The lead had a ready cash market in St. Louis. In a depth of from 35 to 40 feet the galena found was mixed with deposits of a foreign matter that appeared black or resin-like, and, under the vernacular name of black jack, inconvenienced the mining operations a great deal. In July, 1874, Messrs. Ed. Porter and Pat. Murphy shipped a carload of this "resin tiff" to Matthieson & Hegler's zinc works at La Salle, Ill., to ascertain whether it could be profitably utilized.

It proved to be a high grade of zinc ore, which at first sold at $3 per ton, but gradually, as its fine quality became known, brought $7 and $8, $12 and $15. In consequence of this discovery the miners abandoned to a large extent lead mining in order to operate for zinc.

Regarding the geological formation, very little can be clearly and positively defined owing, at least, partly to the fact that no appropriation for a State survey was made until at the last session of the State Legislature. The superintendents of this work, Messrs. Potter, Jenney and I. D. Robertson, are astonished at the magnitude of the region.

The ore deposits are found in the sub-carboniferous formation; the surface shows little evidence of eruptions, covered, as it is, with debris and loam. The ground, in depths of from 20 to 150 feet, has characteristics in the way of selvage, slicken-sides, and slips, but no regular striation lines enabling a distinct classification as to veins or deposits. The conglomerate mass is composed of limestone, chert rock, dolomite slates, shales, pyrites, and calcite, associated with the lead and zinc ores, the first two being the most frequent, and often forming beds, between which the miner tries to sink his shafts.

The popular theory that the valuable ores were formed by lateral secretions, though not unanimously accepted, is based on plausible evidence. Deposits of that kind can easily be formed by surface waters charged with acids flowing through the igneous rocks, gathering the metal and depositing it in the numerous openings or fissures. Zinc blende or sphalerite, locally called "jack" or "tiff," occurs massive as well as in crystals. When pure it is almost white, and its color, varying from a waxy steel gray to black, has little or no relation to the per cent. of metal and the commercial value of the ore. According to analysis made by Mr. Hampton Woods, of Duncan & Woods, Belville camp, Joplin ore proper contains from 50 to 62½ per cent of pure zinc blende, Webb City and Carterville 49 to 60 per cent., Short Creek 45 to 49, sometimes 55 per cent. The Lehigh camp grade is the highest. In some mines the ores are found in large boulders and masses, intermingled with the various gangues; again it occurs in small particles imbedded in seams of decomposed ground and black mud, or disseminated in the rocks. The fact that this class of primary ores generally has a resinous luster, and when broken up leaves a smooth surface on the cleavage, points to a movement of these ores from their original positions by eruptive force, so that they are only croppings from larger bodies, and have emanated from pre-existing fissures.

The secondary ore is invariably in a perfectly crystalized form; large masses are found closely cemented together and have a black or blue-black luster. It appears also in pebble form, smooth, probably from the wear of constant movement. This leads to the conclusion that the secondary ores owe their origin to surface and underground waters percolating through the primary ore bodies, and thus impregnated with material that eventually formed a crystal of ore. The corollary of this supposition, that they are still being formed, is demonstrated. In abandoned workings, implements have been found covered with crystals of ore cemented closely to the tools. The ore bodies have been found at all depths from the surface down as far as any development has reached; they do not run in sufficiently regular lines to make the attempt to locate open ground from surface indications generally successful.

The lead ore of this section is commonly a large cubed galena, with the cubes lying at all angles, cemented together as it were, and occasionally broken up, with small particles called "shines" distributed through the chert and limestone rocks or intermingled with the cement fillings of the numerous openings.

As to the extension of the ores, the supply has not shown any sign of exhaustion. The deepest drills, 600 feet, have never yet failed to demonstrate its downward continuation. Single mining lots, not exceeding an acre in extent, have been worked without interruption for the last 12 years and are still producing. Although only about one-tenth of the district has been prospected or developed, the value of the annual yield is $3,000,000.

The significance of this figure increases greatly in view of the fact that the mining methods are highly primitive. Not only are the appliances crude, but the lease or royalty system, whereby miners secure a tract of land from the owner under obligation to develop it, and pay a certain royalty on all ores mined and cleaned, forces the generally poor lessees to seek early returns. Considerable drifting is not attempted; the ground is not secured with timbers; the shafts, mostly not over 3 x 4 feet, are frequently abandoned in a depth of 40 to 80 feet, for lack of pumps. A systematic and improved working plan and careful development in advance of the stoping would signally lessen the cost of production. With a view to this the Thomson-Houston Electric Light Company has made the preliminary arrangements for building an electric motor plant, and will light the city, furnish power for operating all the mining machinery, and facilitate the work for miners of small means.

From January 5th to December 2d, 1889, Joplin shipped per railroad:

| Ores. | Tons. | Value. |
|---|---|---|
| Lead ore | 12,000 | $504,000 |
| Zinc ore | 88.740 | 2.218,500 |
| Total | 100,740 | 2,722,500 |

| Metal products. | Tons. |
|---|---|
| Spelter | 30,959 |
| Pig lead | 8,400 |

The following table shows the output of some of the larger mines for various periods:

| | |
|---|---|
| Oswego Mining Company, January, 1876, to February 1st, 1889; lead and zinc ores | $1,163,991.08 |
| Holden mines, May 1, 1886, to June 1st, 1889; lead and zinc ores | 117,744.90 |
| Homestake mines, owned by P. Murphy, May 1st, 1886, to February 8, 1889; lead and zinc ores | 137,959 53 |
| Paxton land, November 26th, 1876, to June, 1884; lead ore | 630,000 00 |
| Consolidated Company, from May 1st, 1872, to July 1st, 1889; lead and zinc ores | 885,039.74 |
| Baker land, from 1883, to August, 1889; lead and zinc ores | 560,000.00 |
| Center Creek Mining Company, from July 1st, 1876, to June 22d, 1888; lead and zinc ores | 2,696,236.53 |
| Mahaska Company, November 1st, 1887, to December 21st, 1889; lead and zinc ores | 73,037.91 |
| Ruby Mining Company, July 3d, 1889, to February 15th, 1890; zinc ore | 13,887.27 |

Altogether the Joplin District seems to offer unusually favorable opportunities for the investment of capital judiciously expended, and the application of more scientific work, improved appliances, and intelligent management should give good returns.

**The Farmers' Alliance Wants Government Advances on Products.**—A press despatch from Atlanta, Georgia, of yesterday's date states that the reports current that President Livingston intended to put Farmers' Alliance candidates in every Georgia district for Congress, denied at first, are made certain by to-day's developments. Livingston declares that the farmers will capture the primaries and put their own men in. To begin with, a series of questions have been prepared which all candidates must answer affirmatively. The first pledges the candidates to support the Farmers' Sub-Treasury—that is, the Government shall establish in every neighborhood a bonded warehouse, in which the entire agricultural output will be stored, to be sold whenever the owner likes the tone of the market.

In the meantime the Government is to advance to every farmer 80 per cent. of the value of what he has in store. This will make the Government the owner of 80 per cent. of the agricultural products of the country. This claim is made as having precedent in the treatment of distillers by the Government. As no Democratic candidate can pledge himself to this programme, it means that Livingston will put up candidates who will.

The next pledge is one binding the candidates to vote for Government control of railroads, telegraphs and telephones, and to have stations and offices placed at points of convenience to farmers. This programme has created much comment.

## NOTES ON THE GEOLOGY OF THE DEKAAP TRANSVAAL GOLD-FIELDS.*

By W. H. Furlonge, Johannesburg, S. A. R.

While fulfilling professional engagements, my travels over this portion of the Transvaal have been quite extensive; always on horseback, however, so that anything like a thorough investigation of the ground, passed over, has been necessarily impossible; still, the more minute examination of certain small areas, coupled with general observations, has enabled me to form some idea as to the prominent geological features of the country as a whole.

A large plateau stretches from east to west across the Transvaal, and is called the "High Veldt." It is generally level, or gently rolling, and has an average elevation of 6,000 feet above the sea. It is destitute of timber, and in fact greatly resembles the western prairies of North America, and rock outcrops are not common. It terminates very abruptly to the east and northeast, the descent of 2,000 or 3,000 feet into the mountainous country that occupies its borders being made in a very short distance. These mountains extend in an easterly direction for a distance of 40 miles, when they again terminate, very abruptly, in an apparently flat region composed of marshes and sandy plains, sloping gently but regularly to the shores of the Indian Ocean, a distance of about 100 miles.

The gold fields of this section of the country lie among these mountains, whose summits, however, rarely attain the elevation of the High Veldt, while the valleys between them are from 2,500 to 3,000 feet above the sea.

The accompanying map is the best obtainable, and though it is far from accurate, it will give an idea of the geology and topography of the district, and I propose to include in my description all the country from the eastern edge of the High Veldt to the coast plains, and from north to south, that, from the northernmost edge of the DeKaap Valley, to nearly the center of Zwazieland.

In general, it may be said that these mountain ranges run in a northeast and southwest direction. Though they vary in many instances considerably from that course, as a rule they form fairly continuous chains, though isolated peaks are not uncommon. They usually present a serrated appearance, and are essentially similar, though in miniature, to the Sierra Nevada mountains of California; differing from them in one particular, viz.: that their slopes are steeper. This I account for by the absence of frost in this region; rock-disintegration, and the consequent formation of a talus, is comparatively slow work; and what little rock has been loosened is washed away by the torrents of rain so prevalent during the wet season. As a consequence of the violence of these storms there are no deposits of gravel, as we find them in other parts of the world, and little or no chance for river, and absolutely none for hydraulic, alluvial mining. None of the rivers show the evidences of great antiquity; there are no cañons or gorges cut away, or, if they exist, they are insignificant; no terraces, no well-marked channels, and the approach to the latter is in almost all cases down a very easy gradient. Nor, so far as I can ascertain, have any ancient river beds been discovered in the country.

I have diligently searched for, but failed to find, evidences of glacial action, phenomena with which I happen to be very familiar from my residence in the Lake Superior district and the country north of it.

Here, as in other gold mining countries, are found large granitic areas and belts, flanked by schistose and shaly rocks, which contain the auriferous quartz-veins.

The granite, occupying as it does such an extensive area, may be described first. Its prevailing color is white, or rather light red. The greater part of it is true granite, containing, however, but little mica, which, so far as I have observed, is invariably muscovite. The quartz seemingly always predominates, and the felspar, though principally light red, and occasionally white orthoclase, is, as a rule, accompanied by a large proportion of plagioclase (albite?). Very generally there occurs in this granite a little dark-green hornblende, and occasionally the rock passes gradually into, first, syenitic granite, and then into true syenite.

These granitic rocks are often decomposed to a considerable depth over large areas. I wish particularly to draw attention to the following facts, which may have some bearing on the theory of rock-decay, as advanced by Professor T. Sterry Hunt. The granite here is decomposed only, either in the natural drainage channels, *i. e.*, below "water-level," or in places where the surface- and rain-waters can at least remain in contact with it for a considerable time. Consequently it is only in flat places that the granite is found to be decomposed; whilst on the slopes of the hills bordering these areas, and to which this decayed granite can be traced in unbroken continuity, this rock has merely the ordinary weathered appearance. It is quite solid under the hammer, and, furthermore, instances are frequent that boulders, evidently in situ, microscopically undecomposed, rest on the same material, which, being constantly wet, is in a decayed state. In other words, though subærial decay goes on here as elsewhere, but not so rapidly, the almost universal decomposition of these rocks must apparently be mainly, if not entirely, attributed to the agency of meteoric waters where they are for any length of time in contact with them.

The orthoclase is usually transformed into an arenaceous clay; whilst the triclinic felspars are more or less perfectly kaolinized, and sometimes crumble under the fingers. The quartz, of course, remains, though it generally soon disintegrates into a fine sand.

This decayed granite often covers immense tracts. The town of Barberton is built on the eastern edge of one of them, which is at least 16 by 18 miles in extent. A striking feature throughout the large areas, is what are locally known as "dongas." They are merely water-washes in the decomposed rock, are often of great extent and depth (the latter reaching 200 feet), and sometimes present the most fantastic and picturesque appearances. The accompanying photograph was taken of one of the more striking. I merely state, in explanation, that the rock seen is entirely decayed granite, which is on a "flat," and in a natural drainage channel, whilst the hills in the background are composed of the same rock, but in a normal or solid condition. The fragments that have rolled down the hill on to the "flat," and which have been subjected only to the ordinary atmospheric action, are also undecayed.

This description of rock-decomposition not only applies to granite, but to all felspathic an apparently eruptive rocks. With them, the decay is even more marked, as they contain no quartz, and, though perfectly solid as blocks on the surface, the underlying mass can generally be dug out with a spade to depths ranging from 50 to 100 feet, or perhaps more. The decayed granite, on the contrary, though it will sometimes crumble in the hand, as a rule, yields only to the pick. I have also observed one or two instances of decayed hornblendic schists, though, so far as I know, these are rare.

In describing the remaining rocks of the district, it is convenient to have a starting point: so I take the large basin on the southeastern edge of which the town of Barberton is built.

This basin, which I have previously stated to be entirely floored by decayed granite, is surrounded on all sides by mountains 1,500 to 3,000 feet in height. This last-named elevation is only attained on the western side, where an abrupt ascent to the flat-lying rocks of the High Veldt, which rest immediately on the granite, takes us into an entirely distinct geological horizon. Surrounding this roughly circular basin on the other three sides, are the rocks amongst which the auriferous deposits of the DeKaap fields lie.

All these rocks are highly inclined. This strike is in general tangential to the edge of the granite basin, and they dip, in all cases, away from it, at angles varying from 60 to 90 degrees. It would appear that the rocks on the north and south sides finally come together to the east of the basin, while those which form the eastern border are apparently left as a kind of wedge, which rapidly thins out in that direction. How far east these rocks may go, I have, at present, no means of ascertaining.

The mountains forming the immediate northern boundary of the DeKaap Valley are composed of schists dipping away from the decayed granite area, and they probably form a synclinal with the rocks, likewise schistose, flanking the still higher mountains further to the north, whose mass consists of undecomposed granite. This belt of schistose rocks is, however, quite narrow.

Towards their western extremity, these inclined rocks are true schists, talcose, hornblendic, and chloritic: but to the east they become more and more argillaceous and lose their schistose structure, finally becoming true shales.

The rocks to the south of the basin, though in hand specimens might sometimes termed schistose, are, as a whole, shales, and they are not always argillaceous, but often distinctly hornblendic, and, I think, chloritic.

Interstratified with them, are beds that are not found, so far as I know, on the north side, of sandstone and conglomerate. The sandstone consists of nearly pure quartz, and the conglomerate is made up exclusively of quartz pebbles, cemented together with a generally ferruginous sandstone, containing a small amount of talc.

To the south, these rocks extend well into Zwazieland, some 30 miles in a direct line, forming a succession of ridges, caused presumably by a series of foldings.

An important feature among these is, that there are several of these ridges, which are entirely formed of silica. The mass of the rock composing them is apparently what may be termed a quartz-breccia, as angular fragments of white homogeneous quartz, dark amorphous quartz, and light-colored, pulverulent quartz are cemented together into a massive and compact rock, evidently by silica from solution, which, in the majority of cases, can now hardly be distinguished from the dark-blue fragments. It is deserving of notice, however, that the edges and angles of the enclosed fragments are quite sharp and well-defined, and that there is, as a rule, a noticeable quantity of the oxides of iron disseminated through the whole mass of the rock.

Though in general the strike of the tilted rocks is as I have described, there are many local variations which are very startling, and which form a special feature well worth noting.

In other parts, it is usual to find such rocks altering their strike gradually. Here they do so in most cases very abruptly, and it is no uncommon occurrence to find, within a very few feet, these vertically-dipping rocks striking at right angles to their former direction, and, curious to relate, without any change in their angle of dip. In many places one can see these rocks which, from their composition, texture and color, manifestly form part of the same deposit, abutting so squarely that one could almost believe that they had been cut as with a knife and placed there, whilst at the contact they are perceptibly shattered.

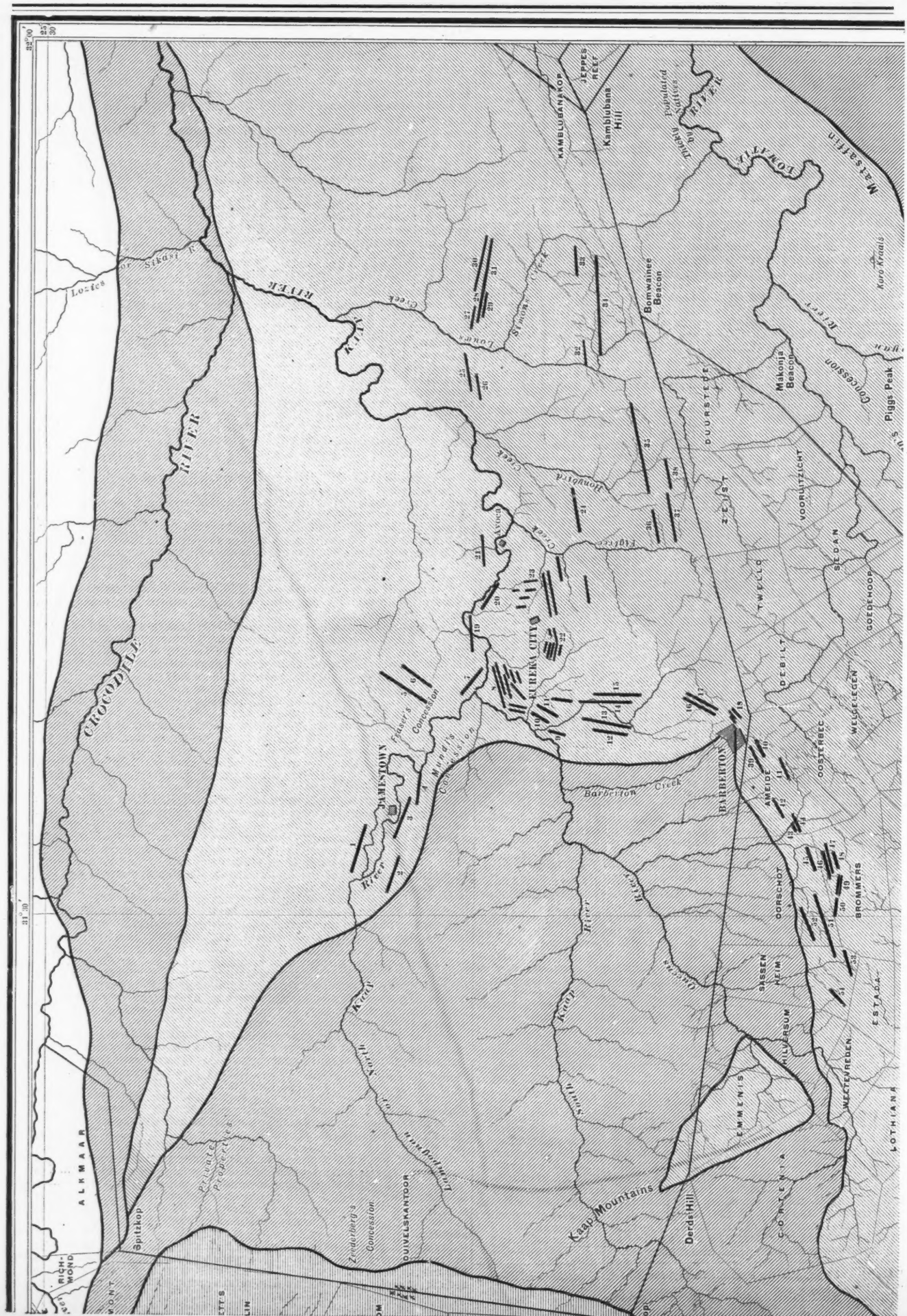
I have never discovered true gneiss in this country, although I have occasionally observed the granite, especially in the vicinity of the flanking sedimentary strata, to become faintly foliated. But even then it could only be termed granitoid gneiss. Neither have I found, so far, any of the more uncommon minerals, such as schorl, topaz, apatite, etc.

An eruptive rock is evidently, geologically, the most recent. Its exact character has not yet been determined, though it is apparently a true diorite. Dykes of this rock are observed all over the country; breaking through, indiscriminately, the granite, the tilted schists, shales and sandstones of the mountainous region described, as well as the flat-lying shales, sandstones and conglomerates of the High Veldt. The most remarkable thing about this rock is that, though I have observed it over an area of more than 300 miles square, specimens from all parts are identical in character microscopically. The fact that it occurs as true dykes is most manifest in the granite; that rock having, by its decomposition, left the greenstone very prominently exposed. In the other rocks, however, the diorite (?) is generally seen on the surface as detached groups of rounded fragments, with no visible connection between them.

In most, if not all cases, where the country is at all flat, this rock is, below the surface, decomposed into an unctuous red clay for a considerable depth; while the rounded surface fragments, though perhaps decomposed more or less on their lower sides, where in contact with the moist decayed portions, are quite solid and sonorous under the hammer. In many cases (though I have never observed this in the granite) this rock has overflowed as a true lava; and in its downward course has involved fragments of quartz, sandstone or shale, which are perfectly angular.

In other places it is usual to find this rock amygdaloidal. The cavities are rarely empty, and, when filled, always with secondary quartz, as are any cracks or crevices which originally existed in it. In these cases the rock is generally more or less schistose in character. With the exception

* Abstract of a paper in the *Transactions of the American Institute of Mining Engineers.*


CROCODILE RIVER
Lozies
Sikasi R.
Spitzkop
ALKMAAR
Private Properties
Zwartberg's Concession
DUIVELSKANTOOR
Kaap Mountains
Derde Hill
JAMESTOWN
Fraser's Concession
A. Mundi's Concession
RUREKA CITY
BARBERTON
Barberton Creek
Kaap River
Queens
Swart
Houtbosch Creek
Eagle's Creek
Lomati River
Sikwane Creek
Kambibana Hill
Jeppes Reef
Bomwaineo Beacon
Makonja Beacon
Piggs Peak
Kuro Kraals
Concession
Matsafflin
LOMATI
DUURSTEDE
ZEIST
VOORLIJTLICHT
TWELO
DEBILT
SLEDAM
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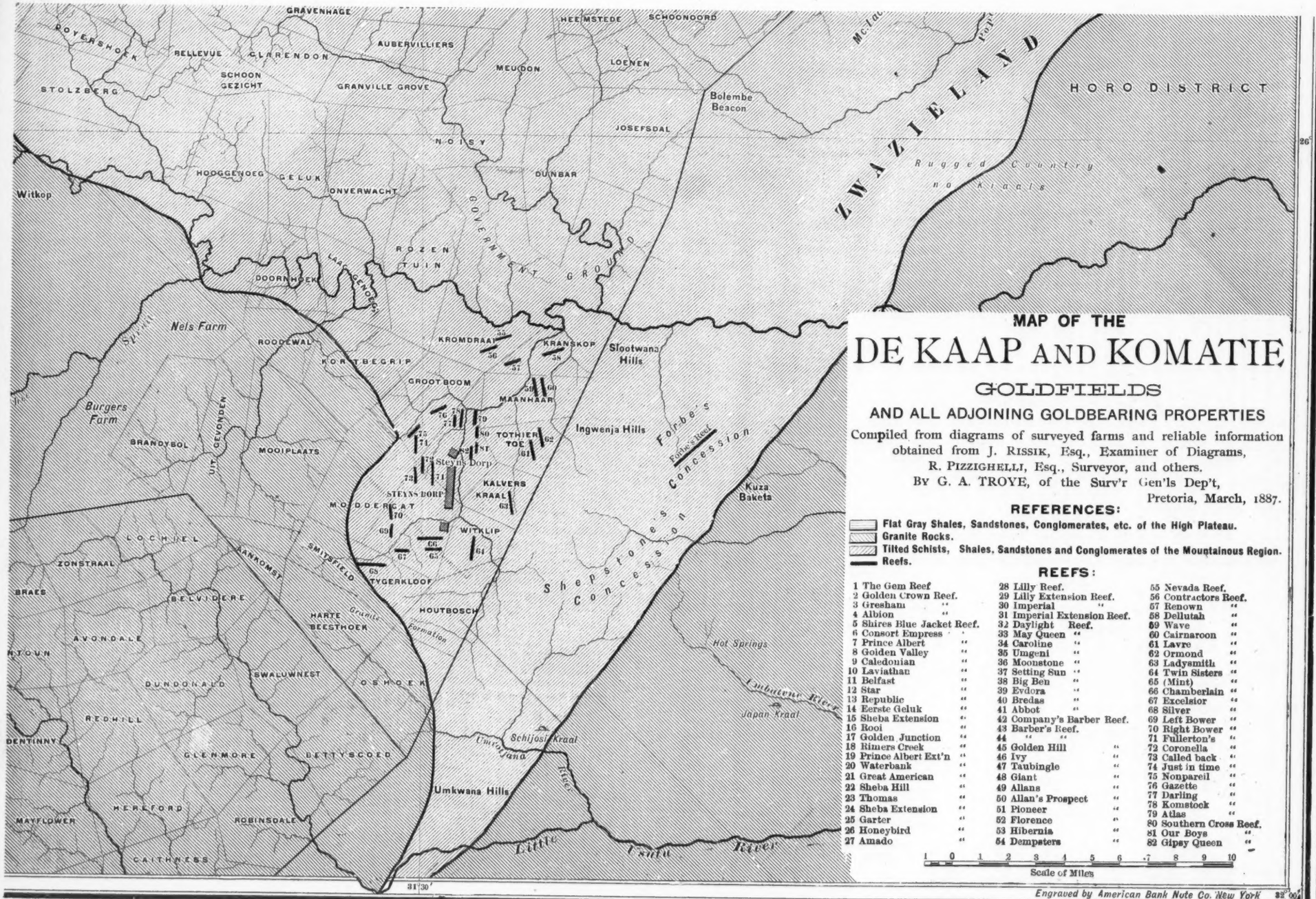


## MAP OF THE

# DE KAAP AND KOMATIE

## GOLDFIELDS

### AND ALL ADJOINING GOLDBEARING PROPERTIES

Compiled from diagrams of surveyed farms and reliable information obtained from J. RISSIK, Esq., Examiner of Diagrams, R. PIZZIGHELLI, Esq., Surveyor, and others.

By G. A. TROVE, of the Surv'r Gen'ls Dep't,

Pretoria, March, 1887.

### REFERENCES:

- Flat Gray Shales, Sandstones, Conglomerates, etc. of the High Plateau.
- Granite Rocks.
- Tilted Schists, Shales, Sandstones and Conglomerates of the Mountainous Region.
- Reefs.

### REEFS:

1 The Gem Reef
2 Golden Crown Reef.
3 Gresham "
4 Albion "
5 Shires Blue Jacket Reef.
6 Consort Empress "
7 Prince Albert "
8 Golden Valley "
9 Caledonian "
10 Laviathan "
11 Belfast "
12 Star "
13 Republic "
14 Eerste Geluk "
15 Sheba Extension "
16 Rooi "
17 Golden Junction "
18 Rimers Creek "
19 Prince Albert Ext'n "
20 Waterbank "
21 Great American "
22 Sheba Hill "
23 Thomas "
24 Sheba Extension "
25 Garter "
26 Honeybird "
27 Amado "
28 Lilly Reef.
29 Lilly Extension Reef.
30 Imperial "
31 Imperial Extension Reef.
32 Daylight Reef.
33 May Queen "
34 Caroline "
35 Umgeni "
36 Moonstone "
37 Setting Sun "
38 Big Ben "
39 Evdora "
40 Bredas "
41 Abbot "
42 Company's Barber Reef.
43 Barber's Reef.
44 " "
45 Golden Hill "
46 Ivy "
47 Taubingle "
48 Giant "
49 Allans "
50 Allan's Prospect "
51 Pioneer "
52 Florence "
53 Hibernia "
54 Dempsters "
55 Nevada Reef.
56 Contractors Reef.
57 Renown "
58 Dellutah "
59 Wave "
60 Cairnaroon "
61 Lavre "
62 Ormond "
63 Ladysmith "
64 Twin Sisters "
65 (Mint) "
66 Chamberlain "
67 Excelsior "
68 Silver "
69 Left Bower "
70 Right Bower "
71 Fullerton's "
72 Coronella "
73 Called back "
74 Just in time "
75 Nonpareil "
76 Gazette "
77 Darling "
78 Komstock "
79 Atlas "
80 Southern Cross Reef.
81 Our Boys "
82 Gipsy Queen "

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Scale of Miles

Engraved by American Bank Note Co. New York

of the amygdules, which are composed of quartz, this rock is perfectly free from that mineral, and the most patient investigation has failed to find any zeolites in the cavities. The hornblende, which usually occurs n circular crystals, largely preponderates over the felspar, which is triclinic.

The wonderful similarity of this rock through the whole of this country, not only in its apparent composition, but its mode of occurrence, its color, texture and the habit of its component crystals, makes it probable that the eruptions of these dykes were contemporaneous. In any case, this rock has had a great influence, in some manner not understood, upon the auriferous nature of the neighboring veins and deposits.

There are few other plutonic or volcanic rocks to be met with. I have, however, on one occasion, seen a small area of porphyry, and in two other instances wide bands of foliated felsite passing into eurite.

I have also observed belts, apparently interstratified with the formation of amphibolite, containing small henches of asbestos. It is, however, questionable whether this can be regarded as an eruptive rock.

A most remarkable feature is the almost entire absence of lime throughout the country; there are, I believe, deposits in the northern sections, but, so far as I can learn, they are very impure and consist of tuff. A small fragment from one of these, such as was being burnt for lime, did not effervesce with acid. A specimen of calcite from a long distance north was shown to me, which was regarded as a curiosity. No dolomite, nor, in fact, any carbonates or sulphates seem to occur in this part of the country.

No less remarkable than the absence of lime is the large preponderance of silica, generally in the form of quartz, that is found not only in and among the shales and schists, but as secondary quartz, penetrating every crevice, crack, and gas-pore in the eruptive or volcanic rocks.

I have before mentioned how this mineral predominates as a constituent of granite, but it is as nothing compared to the amount found amongst the slaty rocks. Here it occurs as segregated masses, interbedded with and evidently in many instances replacing them to some extent. Indeed, these masses often assume such dimensions that they constitute the larger part of the whole country rock. Their shape is generally irregular, sometimes angular, but in the majority of cases roughly lenticular. The lens-shaped bodies are generally connected—though this is not always apparent—by very thin seams or ribs of the same material of which they are composed. Or it may be that they are found to succeed one another at fairly regular intervals, either in a straight line or on both sides of, and at no great distance from, such a line, which can be termed the axis of their strike, and which coincides with that of the enclosing rocks. Many of these series of lenticular quartz bodies are auriferous, and it is found that they are individually far more persistent in depth than in length. Still, the same peculiarities observed in following them along their line of strike are seen perhaps not so clearly on their dip.

Another class of interbedded quartz-deposits, which may be termed segregated quartz-veins, also occur in these rocks. These veins are found, as a rule, to extend for considerable distances along their line of strike. They are often very auriferous, and have, where worked upon, been proven to be continuous to the limited depth attained up to the present time. Their width, however, is very variable. Since they are essentially similar to some of the California veins, I do not see why they should not be equally permanent.

These last described veins, together with the large lenticular bodies of quartz, constitute one class of auriferous deposits of the DeKaap fields. They are generally composed of a dark-blue and homogeneous (never distinctly crystalline) quartz, which sometimes resembles quartzite, from its granulated appearance. There are, however, many instances where the quartz is milk-white, and it then shows, generally, some traces of crystallization. The associated minerals are all sulphides, and consist, usually, only of pyrite or pyrrhotite, more rarely of chalcopyrite and arsenopyrite. Galenite has been found in one or two places only, and sphalerite, so far as I am aware, has not been met with.

The gold, though more "free" near the surface than at a depth, has nevertheless not all been liberated from the sulphides, for samples from some distance below "water-level," which are entirely undecomposed, show often large quantities of gold on being washed. The sulphides are, as a rule, very rich, and never, so far as I know, when free gold also occurs, contain less than five ounces of gold to the ton. Samples containing 30 to 50 ounces are not uncommon, while in one instance I have found them to assay 760 ounces.

The shales or schists enclosing these veins are generally decomposed near the surface for some distance on either side, and are often found to be as rich, or even richer, in gold than the quartz itself. The decomposition of these rocks is evidently due to that of the pyrites, as below "water-level" auriferous pyrites are found to be disseminated through them for a limited distance on both sides of the veins.

Throughout these tilted rocks are found numerous interstratified beds of quartz-rock or quartzite. These are generally of large size, and, as a rule, are continuous for very long distances. Being harder than their enclosing rocks, and therefore offering better resistance to weathering influences, they stand out quite prominently, and are very easily followed. Locally, they are termed "bars," a name given to any persistent or conspicuous bed, a term which I shall adopt.

In spite of the fact that these "bars" are apparently interstratified beds, they usually split into a number of branches, which, though perhaps for a short distance diverging in strike from the main body, soon become approximately parallel to it, without necessarily detracting from its width. Indeed the branch may be, and often is, larger than the bar from which it originated.

The quartz composing these "bars" is never crystalline, but is usually compact and amorphous, from which state it may gradually pass into a roughly granular variety. In color, it varies from black to pure white. Very often the whole bar has a banded structure, ribs of dark and light quartz alternating, the dividing line corresponding to the strike of the enclosing rocks.

In my opinion, most of these "bars" are due to the replacing of the shales or schists by silica. Their structure, where banded, seemingly precludes any other hypothesis. In other cases, however, it is probable that they were originally strata of sandstone, which have been subsequently rendered homogeneous by solutions which permeated them, and which seemingly dissolved, to some extent, their component parts, and redeposited the silica in a gelatinous state.

Rain-water, in this country, seems to have more than usual solvent powers; as, in many places, I have observed the outcrop of sandstone beds to consist externally of compact and amorphous silica, their real nature only being discovered by breaking up the rock. In these cases it is found that the ¼ or ½ inch of the crust, that has been exposed to the weather only, is homogeneous, the granules of the sandstone being easily distinguishable underneath.

The "bars" of quartzite have a very important practical value, inasmuch as the principal gold deposits are found in, or immediately adjoining, them; though never, so far as I know, without there being also some eruptive rock in close proximity. There are apparently three ways in which the gold may occur in them:

First. In the body of the bar itself, where it is found in "chutes," or evenly disseminated, for a considerable distance, through the whole of it; in the latter case, more sparingly. The famous Sheba mine is an instance of the former mode of occurrence, and I could name other mines where the gold has been found more generally and widely distributed. It so happens that I have not had the opportunities to study this kind of deposit.

Second. Where the "bars" themselves have evidently been fissured or fractured, presumably by volcanic outbursts, another variety of quartz has been deposited in the cracks and crevices therein formed. It often differs but little from that composing the bar itself, but, as a rule, is easily distinguishable from it, inasmuch as it is of a different color and texture and more pyritiferous. The "bars" usually contain some of the latter mineral. These more recent deposits of quartz occasionally occur, more or less regularly, along one side or the other of the "bar" itself; but wherever this has been fractured, they penetrate into the body of it. More than one of our richest properties are being worked on this class of deposit, which, at 440 feet below its outcrop, shows no sign of "pinching," though the gold is, to a very great extent, locked up in the pyritous minerals.

Third. Often, instead of these deposits of auriferous quartz, in and alongside the "bars" are others, of great extent, of iron oxides, containing from 30 to 40 per cent. of iron. I may safely say that all this ironstone carries gold, though not necessarily in paying quantities, nor in a state to be caught by mercury. How it really occurs in these thoroughly oxydized ores is not known at present. At the surface the iron ores consist generally of limonite, hæmatite, with some magnetite. In depth, however, the limonite disappears, and the ore then consists of hæmatite and magnetite, the former always predominating, while pyrite also is found in quantity. The gold contained in these ferruginous deposits varies from "traces" to three or four ounces per ton, and in the more extensive of the payable ones may be averaged at 18 to 20 dwts. per ton. The amount which can be extracted by ordinary milling and plate amalgamation usually does not exceed 7 dwts.

The ferruginous deporits are not confined to the "bars," but are also found among the slaty rocks, where they are usually small, however, and are known as "burnt leaders" (from their color). These often "pan" well, and invariably assay better; but, so far as I have seen, they are neither large nor continuous enough to be worked with profit.

Some of the previously-described segregated quartz-veins are so ferruginous that they might fairly be entitled to be classed with these deposits, since it is manifest that these iron ores did not originate in pyritous ores, as, in depth, they give place to a far more quartzose vein matter.

There is no experience from other parts of the world to guide us as to the probable depth to which these "bar" deposits may continue; but the work now being prosecuted has at least proven, in some instances, that they are permanent to depths of 400 to 500 feet, and there is, seemingly, no likelihood of their giving out.

The segregated veins and series of lenticular-shaped bodies are, of course, just as likely to continue down as those in California, and in other parts of the world, and, so far as opened, show no signs of "pinching" or of becoming poorer, wherever I have had opportunity of examining them. In fact, I am of opinion that the future of these fields, so far as gold mining is concerned, is certain to be prosperous when the questions of cheap fuel and cheap transportation have been solved.

I must further mention, that many beds of argillaceous material, which enclose small "stringers" of quartz, and which, presumably, from the decay of the previously contained pyrite, are now a ferruginous red clay, contain payable amounts of gold.

Nor must I forget the beds of conglomerate which are enclosed in the tilted strata, and which, in a number of places, have been found, to a large extent, impregnated with pyrite. In some instances, the whole bed, when oxydized, shows by washing a paying amount of "free" gold; and, when pyritous, often assays over one ounce of gold to the ton. The auriferous pyrite and, consequently, the "free" gold is evidently of later date than the beds themselves, and neither of them, so far as I know, is ever found in the quartz pebbles, but is entirely confined to the cementing material, which is, to a large extent, very porous. Specimens of pyrite in the pebbles themselves, where observed, occur invariably in cracks or crevices, into which they could have been infiltrated. Before very long I look for a large yield of gold from these beds.

The so-called "alluvial" of these fields is really not alluvial gold at all, in the proper sense of the term, and presents so many striking and, as far as my experience goes, unique peculiarities, that it is well worthy of description.

This "alluvial" is usually found on the tops of rounded hills, and in a position where it could hardly have been placed mechanically. An examination of the ground almost always shows that the soil is simply a decomposed felsitic rock, probably a diorite in situ, which contains the nuggets. There is generally a large amount of quartz-fragments also, and seemingly the largest quantity of gold is found where these are most plentiful; but though the nuggets are sometimes found quite smooth and apparently water-worn, the quartz fragments are always angular; and, indeed, I have never observed a pebble anywhere throughout the whole area of auriferous ground. Moreover, the gold only occurs at or near the surface, say not deeper than two or three feet, and it is within the first

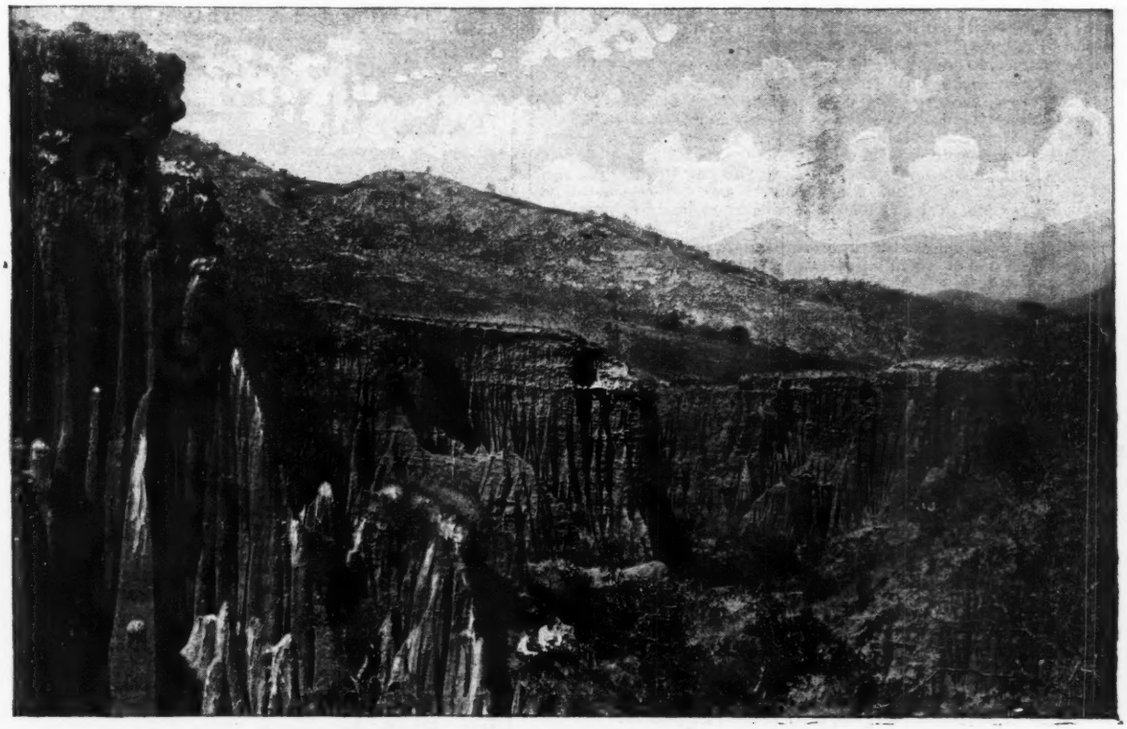
four inches that all the larger nuggets have been found. It must also be observed, that though the masses and fragments of loose quartz have been, of course, repeatedly examined for gold, none, I believe, has ever been discovered in them by washing or otherwise; whilst on the other hand, most of the large gold nuggets contain small pieces of quartz, which, in appearance, are identical with those found scattered over the surface. There can be but little question that these quartz fragments constituted originally the secondary quartz which filled the cracks and crevices of the more decomposed volcanic dykes.

Of course, a certain amount of the gold has found its way into the creeks and river beds, where it occurs as true "alluvial," but it is so insignificant in quantity that I only mention its existence.

The so-called "alluvial" gold occurs also in rather considerable quantities, and under nearly similar conditions, among the flat-lying rocks of the High Veldt; but there the nuggets are found to be distinctly crystalline, and, far more frequently to be associated with quartz, though the latter has never been observed in situ containing gold as nuggets. The main fact of importance is, that it is, found there as before, exclusively in the surface portions of the decayed feldspathic dykes.

Gold which is probably true, though ancient, "alluvial," is also found among the sandstone beds of the High Veldt, and nuggets of considerable size are frequently liberated by its disintegration.

I have before mentioned the white quartz occurring as veins and stringers in the crevices of the granite. It is worthy of note that, in some places, these contain an extraordinarily large percentage of gold. But as they are at best what in miners' parlance are termed "gash" veins, they are of no special interest, except that since it is probable that not only the tilted rocks of the DeKaap fields, but also the flat-lying



DONGA, NEAR BARBERTON.

ones of the High Veldt, were derived directly from this granite, the presence of gold in it gives a possible clue to the origin of that found in the sandstone and, perhaps, the conglomerate beds.

There are among the schists and shales of this district enormous amounts of iron ore; for, besides the deposits hitherto mentioned as occurring in "bars," there are stratified beds, hundreds of feet thick, of almost pure hæmatite, together with some magnetite. These beds generally merge gradually into ferruginous sandstone, and then into true sandstone strata. At any rate, the Transvaal will never be at loss for iron ores, some of which at least are Bessemer ores. Copper is not plentiful. It occurs as chalcopyrites in the veins, and the products of its decomposition are chiefly dioptase and chrysocolla and some other rarer silicates.

Lead is seldom found as galenite in these rocks. Among the High Veldt beds this mineral forms large deposits in places.

Zinc has never, so far as I know, been found in this country.

Antimony or stibnite I have observed in one or two places in unimportant quantities.

During my experience in this part I have never seen any silver ores, though on the High Veldt some of the galena contains amounts of this metal (up to 600 ounces to the ton) that may soon create a large silver mining industry. The gold of these fields contains about 16 per cent.

Mercury, as cinnabar, has recently been found, although up to the present only in small quantities among the tilted rocks. Upon the High Veldt it has also been obtained. I have seen some very handsome hand-specimens of that mineral, which apparently promise well for the future.

Considerable quantities of nickel, and especially of cobalt, occur in these rocks to the north of the High Veldt, but the mines have been closed, owing to the cost of mining in this remote locality, together with the comparatively low price and small demand for these metals.

No salt, gypsum, apatite, or any of the non-metallic minerals have been discovered in quantities sufficient to be of economic value, except asbestos. I have personally seen only samples of these deposits, but should not be surprised if when railway communication is established with the seaboard a profitable industry in that article of commerce will spring up.

The great drawback to this district is the want of fuel and timber. Of the latter, there is but little, and that is generally of no value for mining or building purposes, although in portions of Zwazieland there are "bushes" of fairly good timber suitable for these purposes. Coal, in inexhaustible quantities, is to be had on the High Veldt, within about 70 miles of these fields; but at present it is of no value owing to want of means of transport.

Finally, it may be interesting to note, that the only traces of volcanic action are a number of hot springs, mostly giving off sulphuretted hydrogen.

## OFFICIAL REPORTS.

### KEARSARGE MINING COMPANY.

The directors present the following report of the operations for the past year, and statement of the financial condition of the company.

The product of mineral was 2,225,613 ponnds, which at 86·22 per cent. gave 1,918,849 pounds of refined copper, for which has been realized the gross sum of $241,461.36; from sales of silver, $400.77; from interest receipts, $605.24; add balance of assets, January 1st, 1889, $94,240.10; total, $336,707.47.

The costs have been: Running expenses at mine, $139,503.44; smelting, transportation, and sundry other expenses, $37,264.02; there has been expended in mine plant during the year, $6,000.39; total, $182,767.85—making the balance of assets January 1st, 1890, $153,939.62.

Since we received the able report of our superintendent, which is herewith submitted, we have advices stating that the drift north on the ninth level has improved, the rock from it being now saved, and here we look for stoping-ground soon. The tenth level is also improving. I refer to this because heretofore all our copper has been taken from the three upper levels.

Capt. John Daniell, the superintendent, after detailing the work done during the year, concludes his report as follows:

"In concluding this report I have to refer to the work doing at the Centennial mine. That company is exploring the Calumet Conglomerate about half a mile from our property, and has a quite favorable prospect. Up to the present little beyond preparatory work has been done, and that is quite favorable. The next month or two will show whether an important deposit exists or not. If so, we must be favorably affected, and under any circumstances we shall probably test the Conglomerate within our lines, when the weather is favorable."

SUMMARY.

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| Rock stamped | 56,104 tons. |
| Product of mineral | 2,225,613 lbs. |
| Product of refined copper | 1,918,849 lbs. |
| Yield of refined copper per ton of stamp rock | 34·20 lbs. |
| Percentage of mineral in stamp rock | 1·98 % |
| Percentage of refined copper in stamp rock | 1·71 % |
| Cost per ton of rock hoisted | $1.90 |
| Cost per ton of rock stamped | $2.49 |
| Refined copper, cost per pound at mine | 7·27 cts. |
| Cost of smelting, freight, and all other expenses | 1·94 cts. |
| Total cost per pound of refined copper laid down in New York | 9·21 cts. |

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.

On opening the mine a little over a year ago, after the great fire, the lower levels, where most of the recent work had been done, were found to be in bad order. The timbers were burnt or displaced, the surrounding rock much cracked and difficult of access. Several months were spent in preparation, and on the 11th of February, 1889, we were able to begin hoisting ore, and the Pacific mill was started.

Good progress was made and the mill was kept running on a fair quality of ore until August. During this time a large amount of work was done and the sum of $120,178.02 was produced. In the month of August a disastrous *cave* occurred, the hanging wall falling in and mixing the ore, slate and timbers in an inextricable mass. The rock crumbled so badly that men were unwilling to enter the mine.

By reason of this catastrophe a large amount of good ore was rendered inaccessible. It became necessary to shut down the mill and suspend all operations in the old tunnels and stopes. As soon as the management was satisfied that all attempts to work the old levels would be futile, an effort was made to secure ore for the mills in another direction.

On the 16th of August a winze was commenced, the intention being to sink into the ore sufficiently to ascertain its character and location, with a view to sinking the shaft to another (1,700) level. This winze was sunk in the old ore body, which was here narrow and poor in quality. The pay rock became smaller and more barren as we went down, and this was abandoned.

Meanwhile, a prospect tunnel was begun on No. 2 level, running from north to south on the lode line toward that part of our property known as the Indiana claim, this being a section of ground hitherto unexplored. This tunnel has been vigorously pushed. So many men as could be worked have been employed, and operations have been carried on day and night. The head of this tunnel is, at present writing, 1,010 feet from the shaft. It is impossible to decide how much farther the tunnel may need to be run before ore is reached. While no one can say whether or not there is pay rock ahead, the indications are favorable.

In order to secure material for our mill at the earliest possible date, a second tunnel was begun in November on level No. 3, running in an opposite direction from the preceding, or north. The object of this was to reach a mass of pay rock believed to exist on the East side of the old stopes, being probably an offshoot, if not a part, of the original mine. We estimated that we should have to run 400 feet. Of this distance, we have gone over 350 feet, and hope to reach the ore by February 20th.

In both these prospects we may be disappointed, but we have reason to hope that at least one of them will realize enough to start our mill pending future exploitation.

All the machinery and mills are in fair shape and ready for work, after such repairs as a year's inaction might render necessary.

Nearly one-half the stock is still owned by members of the Board of Direction, as it has been continuously from the beginning of the company's existence.

Mr. Montgomery, our superintendent, has resigned and gone to Mexico. His advancing years and impaired health have for a long time warned us to expect this change. Meanwhile our foreman, Mr. Jones, who has been in the company's employ for fifteen years, is in charge. He is thoroughly capable, and more familiar with the mine and its workings than any man living. We have thought it unwise to incur the expense of a new superintendent till prepared to run the mill, as Mr. Jones is fully competent to superintend present operations.

The sole management of the operations at the mine are now, as heretofore, under the care of Messrs. Hayward & Hobart, two of the directors of the company, whose large experience and well-known ability have produced the hitherto brilliant results.

The company owns an extensive system of water works. While this is not immediately available, it is believed that ultimately it will possess considerable value for irrigation and other purposes.

About 35 men are now employed.

Gold bullion produced by the mines of this company for the year 1889, $137,335.96; operating expenses, $93,747.61; profit, $43,588.35; indebtedness Jan. 1, 1889, $15,446.93; surplus, Jan. 1, 1890, $28,141.42.

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**The Market for Russian Oil.**—The principal exports of Russian oil in 1889 were: To the far East, 5,401,000 cases; Great Britain, 626,000 barrels; North European ports, 354,000; Italy, Spain, Trieste, and Fiume, 470,000; total equivalent about 2,458,000.

**Gold from Siberian Mines.**—A very heavy consignment of gold from the Siberian mines recently arrived at St. Petersburg. The correspondent of the London *Daily News* telegraphs that the caravan, which left Irkutsk on the 9th of December, took 183,840 ounces of gold. The wagons containing it were escorted by 300 Cossacks, under the command of Lieutenant-Colonels Mekrassoff and Karneyeff. Part of this gold was from the Amoor fields.

**New Light for Lighthouses and for Signaling at Sea.**—Mr. Regnard has, according to *Il Progresso*, constructed a pharo-light as powerful as the electric, and the efficiency of which is not impaired by fog as is the case with the latter. A clock-work arrangement pours every 30 seconds 10 centigrams of powdered magnesium into the flame of a round-wick lamp, producing an extremely brilliant flash of light. The weight of the apparatus being only about 6½ pounds makes it applicable also to vessels.

**Determination of Silicon in Pig or Spiegeleisen.**—Mr. Clerc's method of determining the per cent. of silicon in pig or spiegeleisen is easy, quick and exact; it requires very careful weighing, but that is a generally desirable point in iron and steel analyses. A gramme of the metal, finely ground, is put in an alembic of 350 to 400 c. c.; 15 to 20 c. c. of distilled water, 8 to 10 c. c. pure brome, and then about 75 c. c. pure muriatic acid is added and the mixture heated in the sand bath to about 100 degrees. At that temperature the brome reacts on the metal and oxydizes the silicon; the muriatic acid dissolves the iron and manganese. When the heat is kept up until the volume is reduced to 40 to 50 c. c., the residuum of finely separated carbon and silicious matter settles at the bottom. The moment when the decomposition is completed is easily told, as the residuum of iron and silicon is much lighter than the undecomposed iron. After dilution with 200 to 300 c. c. of boiling water and filtration, the residuum is washed in boiling water and burned, the result being pure silicon. This process takes only four hours, and one person can in the same time attend to from 6 to 9 samples. No silicon is contained in the fluid after filtration, and the average error is 0.001-0.002 per cent.—*Gluckauf.*

**Utilization of Slag in Evaporating Brine and other Solutions.**—This invention, by Sir Lowthian Bell, consists in utilizing the waste heat of slag derived from iron furnaces and furnaces employed in other metallurgical operations. The slag may be received into iron vessels mounted on wheels and capable of containing several tons. These vessels when charged are caused to be passed down an incline into a chamber, over which an evaporating pan of large area is set. When the slag blocks are in the chamber they are sprinkled with water to harden the exterior. Steam is thereby generated, and this steam coming in contact with the bottom of the pan imparts its heat thereto, and so heats the brine or solution which the pan contains. Or the steam thus generated may be passed through pipes immersed in the solution. In the lower part of the chamber also there is water, which the blocks of slag, as they progress slowly down the incline, and when they are sufficiently hardened, ultimately reach, and so the water in the chamber is kept at a boiling heat. When the blocks are cooled down to the temperature of the water the carriages on which the vessels containing them are mounted, are passed on up another incline, and so out of the chamber.

In place of using water a current of air may be caused to pass through the chamber in the reverse direction to that in which the blocks travel through it, and the air thus heated may be made to pass beneath the pans containing the brine or solution to be evaporated, the air being led back again to the exit end.—*Jour. Soc. Chem. Ind.*

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## BOOKS RECEIVED.

**[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another part of the Journal.]**

*A Treatise on the Arc Indicator.* By Thomas Hawley. Published by Boston Journal of Commerce Publishing Co., Boston, Mass., 1890. Pages, 88. Illustrated. Price, 25 cents.

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## PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office.

TUESDAY, MARCH 4, 1890.

422,402. Friction-Clutch. Herman Haberlin, Akron, Ohio.
422,403. Process of Making Steel containing Carbon, Manganese and Aluminium. Robert A. Hadfield, Shieffield, County of York, England.
422,425. Mold for Casting. Sylvanus D. Locke. Hoosick Falls, N. Y.
422,439, 422,440, 422,441, 422,442. Blasting Cartridge. Gershom M. Peters, Cincinnati, Ohio.
422,445. Supporting Frame for Electric Railway Motors. Edward D. Priest, Lynn, Mass.
422,454. Horizontal Piston. Horace See, Philadelphia, Pa.
422,457. Treatment of Storage Battery Plates. Chas. Sorley, New York, N. Y., Assignor to the Anglo-American Electric-Light Manufacturing Company, of West Virginia.
422,495. Fluid Motor. Byron B. Bower, Bainbridge, Ga.
422,500. Process of Purifying Aluminium Chlorids. Hamilton Y. Castner, London, England.
422,509. Process of Obtaining Chromium and Chromium Alloys Asahel K. Eaton, Brooklyn, N. Y., Assignor of one-half to Keziah A. Vanderbilt, same place.
422,511. Dynamo Electric Machine. Rudolf Eickemeyer, Yonkers, N. Y.
422,514. 422,515. Manufacture of Explosives. Stephen H. Emmens, London, England.
422,518. Dumping Cart. Francis M. Gibson, Good Hope, Ohio.
422,519. Car Brake. Edmund C. Glover, Randall, Ark.
422,531. Wheeled Earth Scraper. Wilbee E. Kilborn, Sidney, Ohio, Assignor of one half to William H. C. Goode, same place.
422,532. Car Coupling. Abraham Kimber, Indianapolis, Ind.
422,540. Drilling Machine. Francis H. Richards, Hartford, Conn., Assignor to Eckley B. Coxe, Drifton, Pa.
422,550. Compound Insulating Layer for Electric Coils. Elihu Thomson, Lynn, Mass.
422,556 Electric Motor. Henry E. Walter, Schenectady, N. Y.
422,557. Apparatus for Forging Car Axles. Samuel T. Wellman, Cleveland, Ohio.
422,561. Dumping Wagon. George Worthington, Chicago, Ill.
422,562. Furnace for Burning Natural Gas. Frederick T. Adams, Toledo, Ohio.
422,581. Quartz Mill. Jason W. Fairfield Pacific Beach, Cal.
422,594. Apparatus for Marking Rails, etc. Thomas James, Braddock, Pa.
422,706. Chili Mill. Theodore A. Blake, New Haven, Conn.
422,713. Compound Ingot and Wire made therefrom. Levi L Burdon, Providence, R. I., Assignor to the Burdon Seamless Filled Wire Company, same place.
422,720. Shaft Coupling. Elisha P. H. Capron, Norwalk, Conn.
422,730. Method of Electric Welding. Charles L. Coffin, Detroit, Mich.
422,732. Magnetic Separator. Gurdon Conkling, Glens Falls, N. Y.
422,735. Bucket-Attaching Link for Chain Conveyers. Thomas Craney, Bay City Mich.
422,754. Steam Generator. Charles H. Farwell, Atchison, Kansas.
422,755. Electromotor Engine. Sebastian Z. de Ferranti, Hampstead, County of Middlesex, England.
422,764. Self-Oiling Axle. Henry M. Goodman, Louisville, Ky.
422,812. Quartz Mill Battery Guide. Joseph Leyson and William G. Dalling, Walkerville, Mont.
422,822. Dumping Wagon. Addison C. McEwen, Jersey City, N. J.
422,829. Rotary Engine. Washington I. Phifer, California, Mo
422,855. Pulsating Electric Generator. Charles J. Van Depoele, Lynn, Mass.
422,856. Pulsatory Current Motor. Charles J. Van Depoele, Lynn, Mass.
422,857. Alternate Current Pulsating System. Charles J. Von Depoele, Lynn, Mass.
422,858. Converting Continuous into Pulsating Electric Currents. Charles J. Van Depoele, Lynn, Mass.
422,860. Multiple Current Pulsating Generator. Charles J. Van Depoele, Lynn, Mass.
422,870. Grading and Ditching Machine. William C. Williams, Williamsburg, Ohio.
422,873. Method of Lining Journal Boxes. Richard Beddall, Boston, Mass.
422,879. Wrench for Oil Well Tools. William Forgie, Washington, Pa.
422,884. Apparatus for Burning Fuel. Jacob B. Hough, Waynesville, Assignor of one-half to Isaac M. Barrett, Spring Valley, O.
422,893. Roof for Nail or other Furnaces. William J. S. Sheibley, Lock Haven, Pa., Assignor of one-half to Fredericks, Munro & Co, same place.

## PERSONAL.

Mr. Henry Bratnober has returned from England, and is now in Montana.

Dr. D. S. Plume, of Thomaston, Conn., has given a valuable collection of minerals to Columbia College.

Mr. Warner Miller has been elected president of the Nicaragua Canal Construction Company, in the place of A. C. Cheney, who becomes vice-president.

Dr. A. J. Moses has been appointed adjunct professor in mineralogy, Dr. C. E. Colby adjunct professor in organic chemistry, in Columbia College, New York.

Mr. James F. Beattie, Mining Engineer, of Humboldt, Iowa, has been appointed Superintendent of the Newburgh Orrel Coal and Coke Company, of Newburgh, W. Va.

Messrs. Bradstreet & Curtis, bankers, New York, have taken into their firm as a member Mr. H. G. Romaine. The firm hereafter will be known as Bradstreet, Curtis & Co.

Mr. George Moreau, a mining expert from France, is at present in Denver, Colo., in the interest of a French syndicate which is said to contemplate extensive investments in that State.

Mr. John C. F. Randolph, the well-known engineer of New York, is now in Borneo for the purpose of reporting on some gold and diamond mines for English capitalists. He is expected back in June.

Mr. J. L. Martin, general manager of the Argentine Mining Company, of Montana, has tendered his resignation as manager of the company's affairs. Mr. Joseph Chapleau, the present treasurer, will succeed Mr. Martin.

Mr. A. F. Wuensch, well known in Western mining circles, has established a mining and financial agency at Denver, Col., the object of which is to give non-residents information regarding their investments, and to report on and appraise mines.

William B. Scaife & Sons, Pittsburg, Pa., recently presented five of their employés, who had been in their service 25 years, with a handsome silver service apiece. Such generous acts as this and the profit sharing arrangement practiced by H. K. Porter & Co., annually—mentioned in our columns last week—will do more toward securing the desired relation between employer and employé than all the outpourings of a legion of self-called "friends of labor."

Commander F. M. Barber, of Washington, perhaps more than any other one person received the gratitude of the mining engineers at their recent meeting in Washington for having secured for them the courtesies of the Navy Yard, and for the enjoyable visit to the gold mines and Mt. Vernon. He was chairman of the Excursions Committee, a position involving no small amount of labor, responsibility and tact, and the brilliant success which attended his efforts for entertainment and instruction was well earned.

The catalogue of Lafayette College, Easton, shows an attendance of 311 students, and twenty-four professors eminent in their departments of learning. The necessary expenses of a student are extremely moderate, and the courses of study in the ancient classics, mathematics, and sciences seem to be well kept up. A course in electrical engineering has been added. Twelve valuable prizes have been established, and a well-equipped gymnasium provides for the health of the young men.

A special feature of the instruction seems to be the care taken to encourage the habit of simple and earnest communication of connected thought. The classes are heard in small divisions, so that every one may be personally taught. Under the administration of President Knox, the college is growing, and numerous valuable gifts to the library and cabinets are reported.

## OBITUARY.

James S. Watson, a well-known dealer in steel, died in Philadelphia, Pa., on the 3d inst.

Mr. Wm. H. Wilson, a well-known mining operator of Colorado, died suddenly at Denver on the 26th ult.

J. Mervyn Donahue, president of the Northern Pacific Railroad, died at San Francisco on the 3d inst., aged 30 years.

John McMurtrin, aged 77, died at Lexington, Ky., on the 3d inst. He was one of the best known architects in the State.

William Trudgen, owner and operator of the Consolidated mines, embracing the Union, Kanawha and Mt. Morris Works, of W. Va., died at Charleston, W. Va., on the 2d inst. He was a native of Cornwall, England, and was 45 years of age.

Samuel S. Lang, treasurer of the Lehigh & Wilkesbarre Coal Company, died suddenly on the morning of the 3d inst., while attending his duties at the office of the company, at No. 119 Liberty street, New York. Mr. Lang had been connected with the company for the last 14 years. He was about 40 years of age.

Edwin Cowles, editor and proprietor of the *Leader*, Cleveland, died at that place on the 4th inst., aged sixty-five years. Mr. Cowles came with his parents to Cleveland in 1839, where he has since made his home. In 1853 he became a member of the firm which established the *Forest City Democrat*. One year later the name was changed to the Cleveland *Leader*. Mr. Cowles was interested with his sons in the Cowles Electric Smelting and Aluminum Company.

Mr. A. M. Rogers, the well-known mining engineer of Black Hawk, Colorado, died at that place on the 24th ult., aged sixty-two years. Colonel Rogers was prominently connected with different mining enterprises in Gilpin County, and was for the past 26 years manager of the Gregory-Bobtail Mining and Milling Company. Mr. Rogers was a gentleman who enjoyed the esteem and confidence of all who knew him, a man of the strictest integrity and a skillful and experienced engineer.

## INDUSTRIAL NOTES.

The American wire, rod and nail mills of Anderson, Ind., were burned on the 6th inst. Loss $100,000; partly insured.

Furnace No. 3, at Port Henry, N. Y., has been put in blast, and all three furnaces are in operation for the first time since 1882.

The second of the three large anthracite blast furnaces of the Brooke Iron Company, at Birdsboro, Pa., has resumed operations after a year's idleness.

James McMillan, general superintendent of the Cambria Iron Works, has inspected the Baltimore & Ohio Rolling Mill at Cumberland, Md., idle now nearly a year, and they have been leased to the Cambria Iron Company, of Johnstown, Pa.

The Vulcan Mill at Pittsburg, Pa., formerly owned by Long & Co., and purchased by Messrs. Lockhart, Hubbard and others, who have organized the Lockhart Iron and Steel Company, will be put in operation early in March. The product will be bar iron, merchant iron, etc.

We are officially advised that the stockholders have decided to sell the plant of the Birmingham Bridge and Bolt Works, Birmingham, Ala., at public sale on the 15th inst., in order to better reach a basis of settlement, as some of the stockholders did not care to continue the business.

The Mercantile Iron Mill Company has been organized at Trinidad, Colo., with a capital stock of $68,000, by J. A. Lindsay, John Grass, Sol H. Jaffa, M. Lerhart and H. F. Moore. This company was organized to operate the rolling mill, and it will commence running as soon as some repairing can be done on the machinery.

The managers of a number of big mills at Fall River, Mass., have been watching the result of the profit-sharing experiment at the Bourne mill, and it is stated on good authority that a number of mills contemplate doing likewise, for the incentive offered keeps help from leaving, an evil with which every large mill has had to contend.

The Union Iron Works, of San Francisco, Cal., have absorbed the iron works of the Pacific Mail Steamship Company. The Pacific Mail has maintained these works for many years for the purpose of repairing their Mexican, Panama and China steamers, but lately this has proved unprofitable, and Mr. Irving M. Scott secured the works.

Good progress is being made with the installation of 6,000 incandescent lights and a large number of motors at Ironwood, Mich., by the Thomson-Houston Company. The lamps on the fifth and upper levels are now in circuit, and are giving complete satisfaction. It is expected that the system will be generally adopted in the iron mines.

The Grant Locomotive Works, of Paterson, N. J., secured on the 6th instant the site purchased in Chicago, Ill., referred to by the JOURNAL some weeks ago. Mrs. Hetty Green, the chief contestant, failed to put up the bonds requisite to carry litigation further, and the sale was consequently recorded. Altogether, the site has cost the Grant people not far from $700,000. Work on the buildings is to begin at once.

The Cambria Linked Barb Wire Mill, Cambria, Pa., which has recently begun operations, is turning out five tons per day, with a steadily increasing capacity. It is in charge of Mr. Karl Stahl, formerly Superintendent of the Johnstown Chemical Works. No. 2 barbed wire mill has not yet been put in operation, nor is it settled when it will. This mill made barbed wire under the Washburn & Moen patents.

The annual meeting of the Tamarack-Osceola Manufacturing Company was held last week. The old board of directors—Messrs. Joseph W. Clark, of Pomfret, Conn.; Albert S. Bigelow, Charles Van Brunt and Gustave Stellwag, of Boston, and John Daniell, of Michigan—was re-elected for the ensuing year. This company manufactures copper, having rolling mills and other works at Dollar Bay, Mich., near the mines owned by the interests prominent in its management.

The great railway bridge over the River Forth at Edinburgh, Scotland, was opened on the 4th instant by the Prince of Wales with great ceremony. Many eminent engineers and railway directors were present. An immense crowd of spectators witnessed the ceremony. The day was observed as a holiday in Edinburgh in honor of the occasion. Baronetcies have been conferred upon Mr. Thompson, the Chairman of the Forth Bridge Company, and Sir John Fowler. Mr. Baker, the engineer of the bridge, and Mr. Arrol, the contractor, have been knighted.

THE PLAN OF THE AMERICAN AXE COMPANY.—The trust formed of the manufacturers of edge tools in the United States last month—and to which we referred in our issue of February 8th, is for firms joining to share profits upon some basis not known. The agent of the trust has visited Chicago, Indianapolis, Birmingham and other places, and he is reported to have said that he already has secured the consent of the principal tool men in New York and Pennsylvania to become members of the trust. It is stated that the Reliance Edge Tool Company, of Indianapolis, which makes axes exclusively, and has an output of 36,000 of these articles per annum, has refused to join the combine.

Operations toward constructing the shipbuilding works of the Pennsylvania Steel Company at Sparrow Point, Md., to which we referred in our issue of February 22d, are being pushed. A railroad tapping the tracks at Bear Creek is being built to the site of the yard. Piles are being driven down, upon which the necessary piers will be built, and the work of redeeming some waste land is being done by filling in with clay. Mr. L. H. McMurtrie, late superintendent of construction at the Columbian Iron Works, will have charge of the practical department of the shipbuilding industry at the Point. Mr. McMurtrie has gone to England and Scotland to hunt up new methods to be employed in the proposed shipyard. He will be absent about six weeks. Mr. William B. King, late of the Columbian Iron Works, is to be general manager of the marine department, and Mr. Henry A. Magoun and Mr. Gatewood, also from the Columbian Iron Works, will have charge of the engineering and shipbuilding drawing offices respectively. The company is having plans prepared for the construction of a public hall. The first floor will contain offices and a thoroughly equipped gymnasium. The second floor will be for social gatherings and other entertainments. A large bowling alley is also being put up, which will be set apart for the free amusement of lovers of that sport. In about two weeks the second blast furnace will be blown in. Fires have already been started for the purpose of drying it.

## CONTRACTING NOTES.

The contract for building Rock Lane (steel arch) bridge at New Haven, Conn., has been awarded to the Berlin Bridge Company, of Berlin, Conn., whose bid was $3,192.

Messrs. Gordon, Stroebel & Lanreau, Limited, of Philadelphia, Pa., have closed contract with Geo. P. Whitaker & Co., Maryland, for two fire brick stoves to be erected at Principio furnace. A new furnace plant, complete, is also being constructed.

The Philadelphia & Reading Railroad Company has placed an order with the Baldwin Locomotive Works, of Philadelphia, Pa., for fifty locomotives, to be delivered during the summer and fall. They will form part of the equipment in the new Car Trust. Four thousand gondola cars of twenty five tons capacity each and twenty-five passenger cars are being built by the Pullman Palace Car Company.

## MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

**If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.**

**Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.**

**No charge will be made for these services.**

**We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.**

**These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining**

**Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.**

GOODS WANTED AT HOME.

**617.** Saw-mill machinery. Georgia.
**618.** Ice machinery. North Carolina.
**619.** Material for tram road, 3 feet 6 inches gauge. West Virginia
**620.** Engine for tram road. West Virginia.
**621.** Belting: net cash prices. Alabama.
**622.** Wood-working machinery: net cash prices. Alabama.
**623.** Thresher. Georgia.
**624.** Screw plate that will cut pipe and bolts. Georgia.
**625.** Artesian well: bids for sinking same. North Carolina.
**626.** Engine. Maryland.
**627.** Dynamos for arc and incandescent lighting: prices on same. Tennessee.
**628.** Elevator for carriage factory. Georgia.
**629.** Complete outfit of machinery for manufacturing plow handles. Georgia.
**630.** Saw mill; general outfit, 30 to 50 horse power. North Carolina.
**631.** Wood-working machinery for manufacturing crates, baskets, doors, blinds, etc. North Carolina.
**632.** Railway equipment for ten miles of logging and general traffic railroad. North Carolina.
**633.** Canning factory machinery; prices and full information. North Carolina.
**634.** Lead rolling mill that will roll about six tons per day; prices and full information. California.
**635.** Chilled iron rolls; roll chucks; pinion rolls; pinion chucks; screws for housings. New Jersey.
**636.** Twenty-stamp gold mill with copper plates complete. Arizona.
**637.** Electric motors for running mining machinery. New Jersey.
**638.** Water wheel. New Jersey.
**639.** Two mine pumps. New Jersey.
**640.** Carding, spinning, weaving, finishing and dyeing machinery. Virginia.
**650.** Flue boiler, engine, shafting, tanks metal-roofing, brick-work, lumber and hose; all for tannery. Virginia.
**651.** Engine, 75 horse-power; automatic cut-off, boiler pump and heater. Tennessee.
**652.** Mortising machine, endless bed surfacer, and kiln for drying lumber. Tennessee.
**653.** Saw and shingle mill. Michigan.
**654.** Boiler and engine. Georgia.
**655.** Engine, 40 or 50 horse power.; boiler about 50 horse power. North Carolina.
**656.** Engine, 200 horse-power. Georgia
**657.** Light hoisting engine, with naphtha engine, or with boiler using kerosene oil. Virginia.
**658.** Engine, 35 horse-power; boiler, 40 horse-power. North Carolina.
**659.** Turning lathe and molder. Florida.
**660.** Locomotive, 3-feet gauge, 30-pound rail; road 5 miles long. Georgia.
**661.** Ore cars with bottom dump of about 6 tons capacity. Georgia.
**662.** Hand machinery for manufacturing shoes; complete outfit. Georgia.
**663.** Engine, 80 horse power, automatic cut-off; cylinder about 15 x 24 inches. New Jersey.
**664.** Ice machine with a capacity of 10 tons. Virginia.
**665.** Steel rails; 50 to 70 tons of good second-hand steel rails, 30, 35 or 40 pounds to the yard. New York.
**666.** Locomotive, second-hand, in good condition, saddle tank, 3 foot gauge; cylinders, 7 x 12 or 8 x 14 inches. New York.
**667.** Iron ore crusher and elevator; capacity, 15 tons per hour. Alabama.
**668.** Wood-working machinery. Mexico.
**669.** Gold mills, for use at gold mines. Arizona.
**670.** Wood-working machinery. Planing mill, resawing machine, molding machine. North Carolina.
**671.** Electric light plant for 800 to 1,000 incandescent lights. Maryland.
**672.** Electric light plant, one 30-light arc dynamo, 10 ampères; motor for 112- or 220-volt circuit, one or two horse power; one 50-light incandescent dynamo; one 200-light incandescent dynamo; one 100-light incandescent dynamo. Pennsylvania.
**673.** Electric light plant, 75 lights, 16-candle power, incandescent. Virginia.
**674.** Ice plant with a capacity of 5 tons per 24 hours. Virginia.
**675.** Machinery for hosiery factory. Virginia.
**676.** Machinery for brick works, capacity, 25,000 per day. Virginia.
**677.** Engine, 50 horse power; boiler, 100 horse power. Virginia.
**678.** Corrugated iron. Virginia.
**679.** Machine for printing wall paper. Virginia.
**680.** Elevators. Virginia.
**681.** Water and steam pipe; pumps and water tanks. Virginia.

AMERICAN GOODS WANTED ABROAD.

**641.** Mining machinery of all kinds. South African Republic.
**642.** A typewriter or other process for printing music. Queensland.
**644.** Refrigerators for household purposes; hard and soft woods. Queensland.
**647.** Agricultural machinery and farm implements. Tasmania.
**649.** Nail-making machinery. New Zealand.

## GENERAL MINING NEWS.

### ALABAMA.

DE KALB COUNTY.

FORT PAYNE COAL AND IRON COMPANY.—This company has re-elected its old board of directors. The annual reports showed the following:

ASSETS.

| | |
|---|---|
| Real estate | $4,540,414.03 |
| Investment accounts | 719,171.73 |
| Development accounts | 85,204.97 |
| Accounts receivable | 160,847 25 |
| Schoolhouses | 1,897.75 |
| Expense | 55,157.15 |
| Furniture and fixtures | 3,782.67 |
| Cash on hand | 4,800.83 |
| Total | $5,571,276.68 |

LIABILITIES.

| | |
|---|---|
| Capital stock | $5,000,000.00 |
| Profit and loss | 463,931.06 |
| Profit and loss, commissions | 1,756.41 |
| Profit and loss, rent | 141.34 |
| Profit and loss, stores at mines | 161.95 |
| Bills payable | 105,285.92 |
| Total | $5,571,276.68 |

This company seems to be expending money lavishly at its works in Alabama.

The property of the company offers few of the elements of permanent success, and the ultimate outcome of the enterprise can scarcely be considered doubtful.

### ARIZONA.

PIMA COUNTY.

Wm. S. Lyle, President of the Peer, Peerless, and other mining companies of the Quijotoa district, has been visiting the properties, and is reported as speaking favorably of the mining prospects of the camp, and particularly of the Peer mine, which is now said to be looking better than any of the other mines. The mill will be started up very shortly on a fine body of ore recently developed in this ground.

DUQUESNE MINING AND REDUCTION COMPANY.—The ore encountered in the Bonanza or Hensley mine, recently purchased by this company, to the organization of which we referred in our issue of November 2d, 1889, shows from 13 to 18 per cent. copper. If the company finds its property to be what every indication of development work leads it to believe it is, concentrators and smelters will be erected during the present year, and when everything gets well under way two or three hundred men will be employed.

PINAL COUNTY.

SOUTHERN QUEEN GOLD & SILVER MINING COMPANY.—This company has made application for listing its stock on the Mining Exchange at St. Louis. The property of this company is located on Vekal Hill at Casa Granda.

### CALIFORNIA.

INYO COUNTY.

In Argus district, this county, fifty-three mining locations are reported to have been recently made in the interest of Los Angeles capitalists. The owners will put up a stamp mill and will give miners the privilege of working any of the locations for a term of two or three years, the miners to have the proceeds of ore extracted in the work of development.

MONO COUNTY.

The largest placer mining project known in California for years, is reported to be under way in Mono County, near the curious volcanic Nono lake. Twenty-four claims of 160 acres each have been recorded, eight locaters taking each quarter section.

SAN DIEGO COUNTY.

(From our Special Correspondent.)

Feb. 21.

Julian District lies 55 miles east of the city of San Diego, reached by stage from Lakeside 20 miles by rail from San Diego. The Gold King and Stonewall mines are south of Julian; the Owens and Helvetia a little north, and Washington is in the town. Banner is a little east of Julian, and has several good mines; the Shenandoah lies about 15 miles northwest of the same place.

Gov. Waterman's mine, the Stonewall, is attracting much attention at the present time. A new 20-stamp mill started up recently. Each stamp crushes three and one half tons, making the mill 70 ton capacity; the Gates rotary crusher is used with this mill, which crushes finer and leaves the ore in better shape.

The 10-stamp mill is also running, and crushes 25 tons daily; cost of improvements upwards of $150,000. The Stonewall ledge is stripped for nearly 600 feet and is 60 feet wide, 400 feet deep; ore enough to run both mills two years.

### COLORADO

The contract for the construction of the Colorado mineral palace at Pueblo has been awarded. The architecture will be Egyptian in style. The building will cost over $250,000, and will be one of the largest and handsomest in the West. It will be devoted to a permanent exhibit of gems and mineral specimens not only from the mines of Colorado, but from all over the world.

BOULDER COUNTY.

Another coal mine, to be called the Hecla, is to be opened near Louisville. The operators are Joe Donnelly, James Hood, Edward Easley and William Cowdery.

It is stated that a vein of eight feet of coal has been found at a depth of 154 feet. The mine will probably produce coal for the Denver market in about 60 days.

BELDER VS. GOLD KING.—The case of the Belcher mine vs. the Gold King, in favor of the Belcher, was decided on the 26th ult.

BOSTON COMPANY.—This company, the property of which is located at Ward, is reported to have bought the old Davis saw mill location on Left Hand, at the foot of Ward Hill, for its mill site, to erect a 40-stamp mill. The contract has been let for hauling 200,000 pounds of machinery, and the work will be pushed as rapidly as possible.

GREAT EASTERN VS. MAYFLOWER.—The mining case of the Great Eastern mine vs. the Mayflower was decided in favor of the Great Eastern by the jury at Boulder on the 26th ult.

CHAFFEE COUNTY.

Developments are being made in the Tin Cup district, says the Buena Vista *Democrat*, in the Gold Cup, Tin Cup and the Lee Knoll properties, On East Gold Hill pay mineral has been found at a depth of 100 feet. The three properties cover about 2,000 feet of the two-mile stretch of the hill. A number of full claims just as eligible for mining operations can be leased and bonded on favorable terms, because these claims are held by miners who have not the ready money to sink 400 feet in solid rock.

CLEAR CREEK COUNTY.

The following transfers were filed for record at Georgetown on the 24th ult.: Joseph E. Lawton to the Little Albert Mining & Milling Co., Little Albert lode mining claim, in Trail Run Mining District. Consideration, $30,000.

PENNSYLVANIA MINING COMPANY.—At the Jumbo mine, at the head of York Gulch, a fine plant of hoisting machinery is being put in place, and active development of the property will be started. The mine is one of the most promising in a large group owned by this company. Mr. L. Sternberger, the superintendent of the company's operations, is at Idaho Springs, to oversee the erection of the hoisting plant.

LAKE COUNTY.

In the Triangle shaft, under lease to Messrs. Gaylord & Lee, at a depth of 75 feet, and in the contact a fair streak of galena ore has been met with in the iron; and at a further depth of 35 feet there has been opened up a good streak of lead carbonate ore. This ground is near the Evening Star line, and the streak will also probably be encountered in that mine.

ADAMS MINING COMPANY.—The total debt of this company, it is said, will foot up $75,000. Of this, $20,000 is in bonds, $37,000 is owing to the parties leasing the mine, and there is a floating debt of $13,000, with $5,000 interest.

ELK MINING COMPANY.—This company is working away at its new shaft, located between the Lucy B. Hussey and the Dillon shafts. These three shafts, it is stated, have a tendency to solve the question as to the advisability of sinking a deep shaft in Leadville, as they will prove up the contact lying to the west of the fault and show the general trend of the ore chutes from that point.

ENTERPRISE MINING COMPANY.—Less water being found at each succeeding level; the depth is now 720 feet below the Enterprise tunnel. The mine has started up with a full force.

HILL TOYS MANUFACTURING COMPANY.—New York capitalists have, it is said, taken charge of this mine on the 1st inst., and will push its development.

JOCELYN MINING COMPANY.—The tenth annual report of this company has been filed at the County Clerk's office at Leadville. The capital stock is $10,000,000, shares $10 each, all paid up. The existing debt does not exceed $10,000.

MORNING STAR MINING COMPANY.—Affairs at this company's property are looking well, and within a short time it is thought every shaft on the property will be working successfully. The McHarg shaft has been undergoing the process of retimbering, owing to the fact that the lime, at some points, had swollen to such an extent that the timbers were crushed in, but it will soon be ready for work again. The company had been doing this work, though the shaft and the workings in the vicinity are under lease to Colonel Dodge, who has done quite well there.

NEW ENGLAND MINING COMPANY.—The sinking of the shaft on the Ohio Bonanza, one of the claims of this company, says the Leadville *Herald-Democrat*, is going on steadily. The contact cannot but be at a considerable distance below the present bottom of the shaft, but for all that the bottom has been in ore for the past two days. This is very probably one of the numerous stringers of

ore of which we have repeatedly had occasion to remark as being found in that locality.

SMUGGLER MINING COMPANY.—The tunnel has passed through the shale, and is now in blue lime.

THE HARRISON CONSOLIDATED MINING COMPANY.—The annual report of this company, filed at Leadville. shows that the capital stock is $5,000,000, and the existing debt, $92,000.

LARIMER COUNTY.

A syndicate of Denver capitalists, it is reported, are negotiating for a controlling interest in three of the principal mines in Manhattan, which consist of low-grade ore, varying in width from six to 40 feet.

An extensive bed of fire-clay is reported to have recently been discovered a few miles west of Fort Collins.

LAS ANIMAS COUNTY.

According to reports H. D. Vannostrand, assayer at the St. Helen's smelter at Trinidad, has been experimenting with the silica which is found in abundance near Trinidad, and, it is said, has demonstrated that a superior quality of glass can be made from it.

PITKIN COUNTY.

IOWA & SMUGGLER MOUNTAIN MANUFACTURING COMPANY.—This company is organized by the lessees of the Iowa group on Smuggler Mountain, for the purpose of continuing the work of prospecting the property. It has a bond for $50,000, which will expire six months after pay mineral shall have been discovered. Work is being done on the vein a few hundred feet north of the great ore chutes of the Park Regent and Bushwhacker.

## DAKOTA.

Col. Parker's bill, creating the office of mine inspector, passed the Senate on the 25th ult., and has now gone to Governor Mellette for his approval or veto. Under the terms of the law, the inspector's headquarters are to be in Deadwood. The original bill was amended by cutting down the salary from $2,000 to $1,000 per annum.

## IDAHO.

ALTURAS COUNTY.

PINE GROVE MINING COMPANY.—A strike is reported to have been made in the lower tunnel of the Gold Hill at a depth of 500 feet. This strike is thought to be nearly underneath the shaft sunk last winter. It is stated that the ore will run 5½ ounces gold and 15 ounces in silver. The company had allowed its mine to be sold for taxes, subject to redemption, however, and there were attachments amounting to $2,581.25 for labor against the property. This, however, has been satisfactorily settled, the company as soon as they were satisfied of the strike having raised sufficient money to settle these debts. The property is free from debt, with the exception of the notes held by the stockholders for money advanced some time ago.

BOISE COUNTY.

Development work on the 300-, 400- and 500-foot levels of the Wolverine and Crown Point mines at Banner still continues. It is rumored here that Colonel Matt Graham, who is now in Elmira, N. Y., has negotiated a sale of these mines and 20-stamp mill to an English syndicate.

SHOSHONE COUNTY.

POORMANN MINING COMPANY.—The company has made a contract, it is reported, of one year with the Grant smelter for the total output of the mine. It deducts $28.50 for reduction and freight charges, and this leaves a good profit to the mine.

## ILLINOIS.

The State Convention of the miners of Illinois met on the 4th inst. in Springfield. P. H. McBryde of Pennsylvania, President of the National Executive Board, was present. He advised the miners to stand by the scale of prices adopted at the recent convention at Columbus, Ohio, and to refuse to hold any conference with the operators on the subject.

WILL COUNTY.

In addition to the reported discovery of gold or copper on the Campbell farm, near Joliet, and the find of silver ore that came from the borings of an artesian well, the announcement is made that a zinc deposit has been found on the Fogarty place, where the Santa Fé stone quarry is located.

## INDIANA.

Press dispatches state that about a dozen natural gas companies, operating in the northern and eastern portions of Indiana, have formed a trust combination with $3,500,000 capital. The Chicago Pipe Line Company, which is supposed to be the head of the movement, and which has $2,000,000 capital, has declared its purpose to at once lay a pipe line to Chicago, but practical gas men doubt the success of the enterprise, and say it will take four millions to complete the work. There are grave fears that this undertaking may prove a lasting injury to the entire natural gas fields of this State and lead to an early exhaustion of the product.

## MICHIGAN.

COPPER MINES.

KEARSARGE.—The product of the Kearsarge mine for month of February was 86 tons of mineral [last year 90 tons].

OSCEOLA.—The product of the Osceola Consolidated Mining Company for the month of February was 219 tons of mineral [last year 202 tons].

## MONTANA.

CARLISLE GOLD MINING COMPANY, LIMITED.—This company, which is now consolidated with the Empire Mining Company (see ENGINEERING AND MINING JOURNAL December 14th), has completed financial arrangements, and as soon as weather permits will resume operations, principally to work the Phil Shenon properties which it has recently acquired. It is the intention to move the new 60-stamp mill at Empire to the Beaverhead County mines and to operate the other mills on ore from the Empire mine, in Lewis and Clarke County.

CASCADE COUNTY.

BOSTON & MONTANA COAL COMPANY.—This company was organized at Helena, where the principal office will be, by Timothy Wilcox, E. Wallace Fisk, Arthur F. Howes and L. N. Shepherd. Capital stock, $1,000,000, in shares $50 each. The officers are: T. Wilcox, president; A. F. Howes, secretary, and L. N. Shepherd, treasurer. The company has 960 acres of promising coal lands in this county, and it intends to begin active operations shortly.

DEER LODGE COUNTY.

CHAMPION MINING COMPANY.—The long delayed engine which is to run the company's mill at Deer Lodge has at last arrived and been placed in position. The White & Howell roaster was fired up in preparation for the starting of the mill. This mill has been completed for some time, but owing to the delays in transportation of material it has not been started as soon as had been expected. It was built by the Utah & Montana Machinery Company. At the mine the work of extending the levels is being actively prosecuted, and some ore is being stoped out, the best of which is shipped.

GALLATIN COUNTY.

New York capitalists have purchased the Morning Star, Republic and Shoo-Fly mining claims in the New World or Cook City mining district. It is understood that Henry Villard, of the Northern Pacific Railroad, is back of the deal. The railroad, it is stated, will make a hard struggle this season to have Congress give it a right of way across one corner of the National Park to reach these mines. Much work has been done on the mines of this district, but the difficulty of getting the ore to the smelters has retarded operations.

LEWIS AND CLARKE COUNTY.

Mr. D. P. Barnhart has been in Omaha for the purpose of perfecting plans for the purchase of ore at Rimini. He has arranged for the erection of sampling works at Rimini, and will buy ores of every description that are worth smelting.

CRESCENT.—D. P. Barnhart has purchased this mine, and shipping ore to Omaha has begun.

HELENA & LIVINGSTON SMELTING COMPANY.—This company has now two stacks in operation at East Helena, which are turning out 20 tons of bullion per day. Ore from the Cœur d'Alenes is principally from the Helena and Frisco and the Milwaukee, formerly known as the Gem.

SILVER BOW COUNTY.

MAJOR BUDD GOLD AND SILVER MINING COMPANY.—The transfer office of this company has been removed from St. Louis to Helena. It is thought here that this removal has something to do with the rumored purchase of an interest in the mine by Helena capitalists.

## NEVADA.

ELKO COUNTY.

The directors of the Del Monte and North Belle Isle Mining companies, of Tuscarora, have ratified the purchase of the north extension of the Regulator mine and the Silver King mine, located in the immediate vicinity.

STOREY COUNTY—COMSTOCK LODE.

COMSTOCK TUNNEL COMPANY.—Mr. Theodore Sutro, president of this company, has left New York for San Francisco. Mr. Sutro will remain on the coast about two months, attending to the affairs of the tunnel. The suit against the Comstock Tunnel Company in the United States Circuit Court at Carson, Nev., will be tried in March.

OVERMAN MINING COMPANY.—The pulp assays of ore crushed at the Vivian mill are said to average $15.84, more than 50 per cent. above the average yield of the past two years, which, according to the quarterly statements, did not yield above $7 per ton in bullion.

## NEW JERSEY.

CAMDEN COUNTY.

GERMANTOWN SMELTING AND REFINING COMPANY.—Articles of incorporation have been filed in the Camden County Clerk's office by this company. The objects of the corporation are the smelting and refining of mineral ores. The capital stock is $2,000, and is said to be fully paid in. The corporators are Frank A. Byram, Isaac Stead, George W. Stead, A. M. Stead and Charles Hall.

## NEW MEXICO.

RIO GRANDE VALLEY IRRIGATION COMPANY.—The affairs of this company, the object of which is to take water out of Pecos River and convey to San Pedro and Golden for washing placers there, are now beginning to assume proportions that would indicate success as the outcome of their efforts. Construction work is in progress at both ends. Near Golden some 40 men and teams are engaged. At Glorieta, 65 miles distant, where water is taken from the Pecos, 35 men are employed putting in a stone dam across the river, which is to form the reservoir that supplies the pipe line. Huge derricks are erected on either side of the stream for handling rock, the work to all appearances being done in substantial, workmanlike manner. The route over which the water is conveyed to the placer lands near Golden, lies over a broad mesa near Lamy, and as there are thousands of acres of good lands adjacent, the company will also supply water for farming purposes. Judge Granville P. Hawes and Mr. J. A. White, both of New York, are interested in the work.

It is said that the company is closely identified with the Ortiz Grant people, Lawson, Simpson & Co., S. B. Elkins and others of New York; that it has some 11,000 acres of placer ground that will yield from 50 cents to $1 per cubic yard, and that some $5,000,000 capital is pledged to get water on the placers.

## OREGON.

(From Our Special Correspondent.)

PORTLAND, Feb. 27.

The country is still pretty well blocked with snow, etc. Things will probably not be very early in starting up this year.

BAKER COUNTY.

ELKHORN BAISLEY MINING COMPANY.—This company, which has property 15 miles west of Baker City, is operating the Elkhorn mine. A 3½-foot Huntington mill is working nine to ten tons per day, extracting about 81 per cent. The ore is free-gold ore, with a little sulphurets, quartz and clay gangue. The mill started up about November 25th last, and has in 45 to 50 days which it has worked it produced about $12,000 in bullion, which can be verified by the bank at Baker City. The mill is still running. The company is putting in an improved Frue-Vanner to concentrate the tailings, when the ore can be worked considerably over 90 per cent. In one large chute in the mine they have between $300,000 and $350,000 in sight in its present meagre development. This mine, when only a prospect, was examined about three years ago by Prof. J. E. Clayton. He said then it had the finest prospects for a big mine of any mine he ever examined. The past two summers the owners, before incorporation, took out in an arastra $7,000, making the production to date $19,000. The company owns a full claim with ledge running through entire length of claim, three mill sites and water rights. There is about 900 feet of development all on the ledge, with the exception of 175 feet, and majority in ore.

EUREKA AND EXCELSIOR MINING COMPANY.—In relation to the "Cracker Creek" Mill, Mr. Oscar Szontah, the metallurgist, upon whose experiments the mill was built, who also ordered the mill, stands ready at any time to go to the mill and demonstrate what he can do if they give him the chance, free of charge. This may occur. There is too much political ring pulling in the company. Too many cooks.

## PENNSYLVANIA.

COAL.

The coal firm of W. H. Brown's Sons has just consummated a deal whereby the firm purchases outright a tract of 1,000 acres of valuable coal land on the Youghiogheny River, paying, it is stated, $112,500 for the same.

The fight between the thick and thin vein coal operators of the 40 mile radius has assumed a new and very interesting phase. The thin vein operators, who constitute the aggressive element in the fight to have the radius reduced, with the proposed corresponding reduction in freight rates, declared on the 28th ult. their determination to take vigorous action themselves since the railroads have so positively refused to change the radius. It is intimated that whatever action is taken will be before the Chicago meeting of March 13th, relative to the difference in rates between the Hocking Valley, Ohio and Pennsylvania districts.

The Ball, Lewis & Yates Mining Company, of Buffalo, has been negotiating for all the mines along the Sligo branch of the Alleghany Valley Railroad. There are 11 mines, and they possess at least 10,000 acres of coal lands. It is the intention of the company to make Rimersburg the headquarters of the concern, as it is located about the centre of the coal field.

The Schuylkill Coal Exchange report, dated Pottsville, March 1st, shows the following collieries drawn to return prices for coal in February, 1890, to determine the rate of wages to be paid for work for the last two weeks of February and first two weeks of March: Boston Run colliery (P. & R. C. & I. Co.), $2.30.3; Gilberton colliery (P. & R. C. & I.Co.), $2.36; Girard colliery (P. & R. C. & I. Co.), $2.28.3; Kohinoor colliery (P. & R. C. & I. Co.), $2.36.8; Locust Spring colliery, $2.33.4. The average of these prices is $2.32 3/5, and the rate of wages to be paid is six (6) per cent. below $2.50 basis.

LEHIGH AND WILKES-BARRE COAL COMPANY.—A fire occurred about six o'clock on the evening of the 3d instant in the South Wilkes-Barre shaft of this company, at Wilkes-Barre, by which several men have lost their lives. The day gang had just come out and the night gang was going in. A party of seven men was at work driving an airway opening from one of the gangways, about 2,000 feet from the foot of the shaft. When about 400 feet from the foot of the shaft, the naked light on the hat of one of the men fired a small body of gas. It could hardly be called an explosion, merely a rush of flame along the roof; but the gangway was as dry as bone, an unusual thing, and the timbers which lined its sides and the roof took fire like tinder, and in a moment, almost, fanned by the strong air current, the gangway was in flames. As soon as the extent of the disaster was realized gangs were organized, each to work two hours, and the wall of fire that shut in their unfortunate comrades was attacked with desperation, but without success, and all hope is abandoned, as it will take much time to flood the mine. The supposition now is that the men did not get far from where they were working. The air pumps were worked to their utmost capacity to ventilate the Stanton mine which adjoins and is connected with the South Wilkes Barre shaft. In order to reach it, however, they had to travel over a mile from the place where they were working and it is feared that they were overtaken and suffocated by smoke. The fire will cause a very heavy loss. The company has been particularly unfortunate of late. Only a month ago seven men lost their lives in the company's mine at Plymouth.

PLYMOUTH COAL COMPANY.—A serious accident occurred on the 5th inst. at the colliery of this company, at Plymouth. Two men were fatally injured by the premature explosion of a charge.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to February 28th, were as follows:

| | 1890. Gals. | 1889. Gals. |
|---|---|---|
| From Boston | 254,194 | 621,544 |
| Philadelphia | 15,286,812 | 19,389,729 |
| Baltimore | 1,202,454 | 2,013 |
| Perth Amboy | 769,987 | 2,021,446 |
| New York | 61,796,357 | 66,583,738 |
| Total exports | 79,309,804 | 88,618,470 |

## SOUTH DAKOTA.

CUSTER COUNTY.

GLENDALE TIN COMPANY.—The first block of commercial tin produced by this company, whose works are at Hermosa, was sent to the office of the American Tin Plate Association at Pittsburg, on the 3d inst. The block weighs 25 pounds. The company has started operating its tin reducing plant.

## VIRGINIA.

WISE COUNTY.

SOUTHWESTERN VIRGINIA MINERAL, LAND AND IMPROVEMENT COMPANY.—This company has received, according to reports, and accepted an offer of $1,000 an acre for a one-ninth interest in a tract of land near Big Stone Gap, in Southwestern Virginia. The contract out of which this ninth interest is sold contains about two hundred acres, and when the company purchased it, three years ago, they paid $30 an acre for it.

## FOREIGN MINING NEWS.

## CANADA.

PROVINCE OF NOVA SCOTIA.

COLCHESTER COUNTY.

OLDHAM, March 3.

(From our Special Correspondent.)

LONDONDERRY IRON COMPANY, LIMITED.—The first shipment of iron ore from the Nictaux mines in Annapolis County arrived at the furnaces on the 18th inst., and was used in the puddling furnaces for fettling. It is a high grade ore yielding over 60 per cent. metallic iron, but it is not expected to be as satisfactory as Londonderry ore. This shipment was the first instalment of a large contract which the Londonderry Company have made with Mr. Stearns, the owner of the Nictaux property.

HALIFAX COUNTY.

OLDHAM GOLD COMPANY.—The mines and property of this company are to be sold, by order of the court, at public auction in Oldham on the 22d inst. The sale is but another step in the litigation in which this property has been involved for over three years, and it is understood that another suit may be the outcome of this sale.

STANDARD GOLD COMPANY.—This company is making plans for a new stamp mill of the most approved modern type. At present the quartz from the company's mines are crushed at the mill of the Oldham Company, which is of very inferior construction and badly out of repair. The Standard is the only property in the district which pays, and the management propose to earn a dividend by the saving the new mill will make.

QUEENS COUNTY.

PARKER-DOUGLASS COMPANY.—This company has ordered from the Rand Drill Company a duplex air compressor to be run either by steam or water power, and of a capacity to supply nine No. 2 drills. This company is also considering a project to transmit 250 horse-power, a distance of about one and one-quarter miles, there being a water power of that size near the outlet of Malaga Lake.

## MEXICO.

LOWER CALIFORNIA.

(From our Special Correspondent.)

ALAMO (Santa Clara district).—This camp is barely a year old, and was described and illustrated in the ENGINEERING AND MINING JOURNAL, March 23, 1889. It bids fair to be a point of great interest to the mining world if developments demonstrate the permanency of the ledges.

The International Company owns many of the mining claims. The ore being taken from an 18-foot vein in the east drift of the Princesa is the richest brought to the surface. The company's mill has been closed down for a few days. The Moore and El Paso mills are running night and day.

The Aurora mine is steadily producing ore whose richness increases with developments.

The Butler mine is to have a tunnel to cut the ledge at 1,000 feet. Surface ore from this mine is rich, and the owners hope from their height above the gulch to strike free milling ore for some depth.

The gold specimens are abundant and placering is carried on extensively, and in most cases profitably.

A rich silver ledge has been discovered in San Felipe Bay, 120 miles south of Yuma, running from 1,000 to 5,000 ounces silver; numbers of prospectors are leaving the camp for this place. The Cedros Island mines have been quietly developed; ore has been reduced at Pueblo, National City, and the last shipment was sent to San Francisco. The owners are mostly Philadelphians.

Hydraulic mining has started up at Real to work the placers at that place, belonging to a company who also own and intend to operate a number of quartz ledges; 100 men will be employed by them.

## MEETINGS.

Alabama Mining Company, at Room 6, No. 302 Montgomery street, San Francisco, Cal., March 10th, at 1 P. M.

Alamo Coal Company, at the office of J. E. Sundstrom, Colorado Springs, Colo., March 10th, at 10 A. M.

Bailey Mining Company, at Room 6, No. 302 Montgomery street, San Francisco, Cal., March 10th, at 1 P. M.

Big Hole Placer Mining Company, at the office of Baskin & Van Horne, No. 170 South Main street, Salt Lake City, Utah, March 10th, at 3. P. M.

Coahuila Coal Company, at the office of J. E. Sundstrom, Colorado Springs, Colo., March 10th, at 10 A. M.

Delhi Mining Company, at Room 3, No. 1 Sutter street, San Francisco, Cal., March 12th, at 10 A. M.

Hale & Norcross Silver Mining Company, at Room 58, Nevada Block, San Francisco, Cal., March 12, at 1 P.M.

Humboldt Mining Company, at Room 6, 302 Montgomery street, San Francisco, Cal., March 10th, at 1 P. M.

Mammoth Mining Company, at No 163 S. East Temple street, Salt Lake City, Utah, March 22d, at 2 P. M.

Pennsylvania Mining Company, of Colorado, at Idaho Springs, Colo., March 10th, at 2 P. M.

Sloss Iron & Steel Company, at Birminghan, Alabama, March 19th, at 12 o'clock noon.

United Brass Company, at the office of Messrs. Barlow & Wetmore, No. 206 Broadway, New York City, March 17th, at 11 a. m.

Virginia Consolidated Mining Company, at 147 Fifth street, San Francisco, Cal., March 11th, at 3 P. M.

## DIVIDENDS.

Granite Mountain Mining Company, dividend No. 61 of 50 cents per share, aggregating $200,000, payable March 10.

Napa Consolidated Quicksilver Mining Company, dividend No. 36 of 10 cents per share, aggregating $10,000, payable April 1st, to stockholders on record March 15th.

Tamarack Mining Company, dividend No. 9 of $3 per share, aggregating $120.000, payable April 1st, to stockholders of record March 10th. Transfer books close March 11th, and reopen March 18th.

## ASSESSMENTS.

| COMPANY. | No. | When levied. | D'l'nq't in office. | Day of Sale. | Amn't per share. |
|---|---|---|---|---|---|
| Baltimore | 6 | Jan. 10 | Feb. 21 | Mar. 12 | .20 |
| Col. St. Gothard, Cal | 1 | Jan. 14 | Feb. 17 | Mar. 10 | .05 |
| Crocker | 8 | Jan. 30 | Mar. 5 | Mar. 28 | .10 |
| Drytown, Cal. | 6 | Feb. 8 | Mar. 9 | Apr. 9 | .02 |
| East Best & B., Nev. | 1 | Feb. 11 | Mar. 14 | Mar. 31 | .25 |
| Elk M'tain, S. Dak. | 6 | Jan. 25 | Feb. 25 | Mar. 12 | .004 |
| Eureka, Cal. | 1 | Feb. 24 | April 5 | Apr. 21 | .03 |
| Gate City, Dak. | 1 | ..... | Mar. 15 | Apr. 2 | .00½ |
| Grand Prize | 24 | Jan. 27 | Mar. 5 | Mar. 25 | .30 |
| Happy Valley, Cal. | 6 | Feb. 12 | Mar. 24 | Apr. 14 | .65 |
| Locomotive | 6 | Jan. 31 | Mar. 3 | Mar. 21 | .05 |
| Martin White, Nev. | 23 | Feb. 12 | Mar. 31 | Apr. 30 | .25 |
| Mineral Hill | .... | Jan. 15 | Feb. 19 | Mar. 10 | .003 |
| Occidental Con. | 5 | Jan 20 | Feb. 25 | Mar. 24 | .25 |
| Silver King | 4 | Jan. 15 | Feb. 26 | Mar. 27 | .30 |
| W. Y. O. D., Cal. | 5 | Jan. 6 | Feb. 8 | Mar. 10 | .15 |

## MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 303 and 304.

NEW YORK, Friday Evening, March 7.

There has been a better distribution of activity in mining shares this week and, in some cases, there have been advances in prices, but on the whole the market continues to show the same characteristics that have prevailed for months past. Occasionally in one or another stock there will come a spurt which will improve the tone of the market, but relapses into the old and discouraging condition of semi-dormancy seem almost inevitable. Activity one day is often followed by great dullness and depression the next. There have been no continued activity and advance in prices in any stock, either to sustain or to stimulate the interest of the investing public. The committee on mining securities has apparently fallen into a state of "innocuous desuetude" which encourages the prompters of mines of the "wild cat" species; and what is worse, it discourages investors who, a few months ago, hoped that the committee would have sufficient energy to bring about something of a reform in the mining department.

Alice has been firm at from $1.20 to $1.30; there is little doing in the stock. The company is being criticised for the non-appearance of an annual report. The management has usually suppressed all information concerning the affairs and prospects of the company until Mr. Walker was ready to unload another mine on it. Mr. Walker, of Salt Lake City, owns most of the stock, and seems very much averse to letting the smaller shareholders know anything about the mine. One stockholder who wrote to the president last December received the answer that he would receive the information which he requested after the annual meeting. The stockholder has waited patiently for information concerning the property in which he had a share, and, not getting it, sold out. This is a sample case. Outside investors have absolutely nothing to guide them in investing in such stocks, and if they do happen to buy them, it is so difficult to obtain any definite information from the property of the company, that they are disgusted and sell out, often at their loss. We understand that the annual report will appear on next Monday, but the question why it was so long delayed is not satisfactorily answered. Moulton shows one sale at 31c.

Adams, which sold at 80c. on Wednesday, has advanced to-day to 90c. bid, with a few hundred shares offered at $1. Reports of strikes in this property have been received, and it is stated by the officers of the company that the prospects are more encouraging.

Freeland was again the center of attraction, and the largest business of the week was done in this stock, amounting to 52,930 shares. The price advanced from 60 cents to $1.30 on Monday, on Tuesday declined to $1.10, on Wednesday to $1.05, and has been selling since then at from $1.10 to $1.25. From all information received, and as already stated in our last issue, the belief is strong on the Exchange that Freeland is being manipulated by interested parties; and inasmuch as brokers who are not directly affected by it have been offering to sell at prices considerably below those at which the reported large sales of the stock have taken place, the transactions savor strongly of a speculative boom.

Aspen has again reached the $9 mark, and the continuation of dividends may still further advance the price. Breece is neglected at 40c. and 45c.; Leadville at 10@12c. Little Chief showed considerable activity and advanced from 25 to 31c. Lacrosse advanced from 7 to 11c. It is said that people who are interested in it as well as outside buyers have had dealings in the stock this week.

Little was doing in Silver Cord at 45@47c.

One sale of Small Hopes is reported at $1.10.

Ontario shows a further advance, and on Monday sold at $40.25. Sales were made to-day at $40. The demand for Horn Silver continues, and in consequence the price has shown a rise from $2.20 to $2.45.

The various copper stocks were neglected this week and not a single sale is reported.

El Cristo is neglected at $1.30@$1.40.

Rappahannock's business is small at 5@6c.

Mutual is steady at $1.60@$1.65.

Silver mining of Lake Valley, which is rarely dealt in, showed a few sales the beginning of the week at 36@38c.

Deadwood Terra remains unchanged at $1.50. Caledonia continues to be firm. There were no transactions in Homestake, Iron Hill and Father de Smet.

Phœnix, of Arizona, continues to hold its own at from 76@83c. Silver King received more attention this week, but showed a declining tendency, going from 50@40c., the latter figure being the closing one to-day.

This week suggests the same remarks that we applied in our last issue concerning the Comstock shares, and the conviction is growing stronger that such is the case. Consolidated California & Virginia is quiet at $4.75@$4.80. The San Francisco *Bulletin* is authority for the statement that offers to sell the dividends on that stock for the next six months at 15 cents a share have been made by operators in that city. There are several operators at Virginia City who, it is stated

are willing to buy the dividends at that figure.

Crown Point shows a decline from $2 to $1.70. Gould & Curry, from $1.55 to $1.45. Ophir sold at $4.30; Savage at $1.75; Yellow Jacket at from $2.25 to $2.40; Alta at from $1.35 to $1.40; Best & Belcher at $1.95; Chollar at $2.60. Utah declined from 80 to 45c., and later advanced to 75c., selling to-day at 65c.

There were no transactions in Comstock Tunnel stock and bonds but one sale in scrip at $33. Belle Isle is quoted at from 25 to 30c.; Navajo at 30c.; Commonwealth at $4, and Del Monte at $1.

Little or nothing is doing in Barcelona at 23@25c.

Eureka Consolidated sold at $3.75.

Astoria is still in the hands of the manipulators, but this week the condition of affairs as to the price was reversed, and it went from 8c. to 5c. The reports show that some 34,000 shares changed hands. Sutter Creek also took the downward course and went from $1.60 to $1.40. Nothing is being done in Middle Bar and Amador. All the other California stocks show no transactions.

The Tennessee Coal, Iron, and Railroad Company's suit against Mr. John H. Inman, to which we referred in our last issue, has been discontinued, the following being the terms of the settlement agreed to:

"Since the commencement of this action, the complainants having made a more thorough investigation of the transactions involved, and having satisfied themselves that information which was assumed and relied upon by them was inaccurate, and that there is no liability by reason of the matters stated in the complaint on the part of the defendant and his associates, and it thereupon having been agreed between the parties that the complainant's bill should be dismissed, without costs to either party as against the other upon the conditions hereinafter contained, it is hereby agreed between the complainants and the defendant that, without costs to either party as against the other, the bill of complaint be dismissed; that an order to that effect be entered, and that this is in full withdrawal of any claim on the part of the complainants by reason of the matters in the bid of complaint alleged, the understanding being that no future suit shall be brought, but that the arrangement herein made terminates and settles all questions and is final."

We are pleased to record this action, but what an unenviable position it places Mr. T. C. Platt, the president of the company, in, to have brought a suit for $2,500,000 and have to admit he did not know the business transactions on which he made this claim. There are some who still prefer to think there has been some deal between the parties interested. Presidents N. Baxter, Jr., of the Southern Iron Company, and De Bardeleben, of the De Bardeleben Coal and Iron Company, of Birmingham, Alabama, are both in the city to-day, and in consultation with President Thomas C. Platt and other officials of the Tennessee Coal and Iron Company regarding the consolidation of the three companies into one great corporation that would practically control the entire coal and iron industry of the South. The three companies have a combined capital of $22,000,000. In their present condition they are all competitors, and their several interests frequently clash. The consultations so far have been of an informal character, but as all parties are agreed that a combination would be advantageous, it is probable the scheme will eventually be carried out. The settlement of the suit of the Tennessee Coal and Iron Company against John H. Inman was confirmed by the directors of the company at their meeting yesterday. President Platt, who was supposed to have been opposed to the settlement, is understood to have raised no objection to the confirmation, but personally refrained from voting.

### Boston.

March 6.

(From our Special Correspondent.)

The market the past week has continued dull, without any special feature. There seems to be no disposition to load up with stocks at the present time, in view of a possible stringency in the money market, and at the same time there is no pressure to sell stocks which have been paid for, and on which fair dividends are assured. The demand for ingot copper continues fairly active, and the mines generally are getting out more copper than last year, and as the price continues firm and with a much better outlook for the coming year, it is quite reasonable to expect larger dividends during the next twelve months.

Calumet & Hecla holds steady at $253@$255.

Tamarack quite strong at $160.

Boston & Montana has had a dull week of it; less than 1,000 shares have changed hands, but the price has ruled steady at $45@$45½.

Quincy unchanged at $70.

Osceola quite firm at $26@$26½.

Atlantic sold up to $13¼, a gain of the fraction.

Kearsarge a shade lower at $9, a small lot selling at $8¾.

Butte & Boston has been the most active stock on the list, although the sales hardly aggregate 3,000 shares. It sold up to $15 on buying orders from the lake, but as soon as they were filled it dropped off to $13¼, which was the last sale.

Allouez quite strong at $2½@$2¾; Santa Fe has been rather heavy and touched 97½c., although later sales were at $1; Huron sold at $3½@$3¾, and National at $2.

Centennial sold at $24@$25, and we note a sale of 100 Central at $13, a stock not often quoted in this market.

Pewabic sold at $8¼ for 50 shares.

Silver stocks continue dull. Breece sold at 45c. Dunkin at 60c. Norpa quick silver advanced from $4½ to $5.

*By Telegraph.*—Calumet & Hecla, $255; Tamarack, $158; Quincy, $70; Franklin, $13½; Osceola, $26 bid; Boston & Montana, $45 bid; Kearsarge, $9; Centennial, $24 bid; Butte & Boston, $14¾; Santa Fe, $1; Atlantic, $12½ bid.

### Denver.

Prices and sales during the week ending March 1st:

| Company. | Opening. | H. | L. | Closing. | Sales. |
|---|---|---|---|---|---|
| Alleghany, Colo. | 30a | *31 | 28 | *31 | 9,600 |
| Amity, Colo | 16 | *19 | 16 | *18 | 4,700 |
| Bangkok-C.-B., Colo | 28b | *32 | 29 | 30b | 3,000 |
| Bates-Hunter, Colo | *30 | 20 | *23 | .. | 215,000 |
| Brownlow, Colo | 38b | *43 | 39 | 40 | 18,900 |
| Calliope, Colo | 47½ | *49 | 42 | 45 | 12,200 |
| Clay County, Colo | 42b | 45 | 41 | 43 | 8,600 |
| Hard Money, Colo | 16 | *18 | ‡14 | 15½ | 33,700 |
| Little Rule, Colo | *54 | 50 | 50 | .. | 55,400 |
| Matchless, Colo | .. | 1.20b | 1.07b | 1.10b | ..... |
| May-Mazeppa, Colo | 1.15 | *1.21 | 1.13 | 1.16 | 29,800 |
| Mollie Gibson, Colo | 40b | 50 | 50 | 50b | 700 |
| Oro, Colo | 3.50b | 3.80 | 3 65 | 3.80 | 500 |
| Pay Rock, Colo | 10 | *10¾ | 09½ | 10 | 52,600 |
| Puzzler, Colo | 25b | *28 | 24 | 25 | 28,000 |
| Silver Cord, Colo | .. | 47½ | 47 | 45b | 200 |
| Whale, Colo | 38b | *42 | 37 | 38b | 16,700 |
| PROSPECTS. | | | | | |
| Aspen Mutual, Colo | 21 | *26 | 20 | 21 | 121,400 |
| Big Indian, Colo | 39a | *40 | 35 | 36 | 8,100 |
| Big Six, Colo | 25b | *28 | 24 | 24b | 11,400 |
| Claudia J., Colo | 08½b | *10 | 08 | 09½ | 12,600 |
| Diamond B., Colo | *19 | 10 | *18 | | 222,700 |
| Golden Treasure, Colo | 23½a | 22 | 21 | 21½ | 2,900 |
| Ironclad, Colo | 10 | *13 | 07 | 09½ | 45,700 |
| Legal Tender, Colo | 10½a | 12 | 09½ | 10½a | 25,900 |
| Morning Glim, Colo | 41b | *45 | 39 | 43b | 67,600 |
| Potosi, Colo | 30b | *35 | 31 | 31 | 2,300 |
| Total for the week | | | | | 1,010,200 |

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked. b Bid.

### San Francisco.

The following stocks, listed at the San Francisco Stock & Exchange Board, have been stricken from the list for non-payment of dues: Booker and Goodshaw, Bodie district, Cal.; Elko Con. and Navajo Con., Tuscarora district, Elko County, Nevada; Mount Cory and La Panta, Hawthorne district, Esmeralda County, Nev.; Paradise Valley, Humboldt County, Nev.; Phil Sheridan and Trojan, Virginia district, and North Bonanza, Flowery district, Storey County, Nev.

### Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

**Iron Stocks.**—Prices of these stocks remained unchanged during the past week, except the Ashland Iron Company, which has declined from $75 to $65 asked; Chandler Iron Company, from $46 to $43 asked; Lake Superior Iron Company, from $70 to $68 asked; Montreal Iron Company, $12 to $9 asked; Metropolitan Iron and Land Company, $85 to $75 asked; and the Republic Iron Company, from $50@$49 bid and $51.50@$50 asked. The Jackson Iron Company has advanced from $110@$120 bid and $120@$125,00 asked. The demand is not as active as it was a month or two ago. At that time many parties seem to have bought up most of the stock of the best mines that was in sight. There will probably be a more active demand for these stocks between this and the opening of navigation. At present the stock of some of the best mines is not to be had at any price. The parties who have bought, have apparently bought for permanent investment, and while there is some orders for this stock, there is not a share of some of them in sight for sale.

Many of the large mines are being bought up by some of the large syndicates, which is causing considerable comment and speculation. The Schlesinger syndicate have bought up many of the mines on the Menominee, Gogebic and Marqette ranges, while some of the rich capitalists largely connected with the Cleveland Iron Mining Company, of Ishpeming, with other iron capitalists, have also been buying very largely on the Marquette range; their purchases embrace the Michigan Company's mines and property, the new Merriweather mine, now called the Fitch, near Ishpeming, and the Iron Cliffs Company's property, comprising over 50,000 acres of land, with several good producing iron mines, blast furnaces, etc. These properties, with the Cleveland Iron Mining Companies, insure this syndicate a very good output of the best ore for this present season. These many iron mines are thus consolidated in the hands of a few, with large capital, ample resources of every kind for mining, handling, and shipping the ore, having their own steamships. The Schlesinger syndicate is also building a railroad in the heart of the Menominee range of Escanaba; this, bringing so many of the producing mines under the control of a few large owners, will, undoubtedly, have some effect on the prices of ore, and also on the other mines of this district.

**Gold Stocks.**—The Gold Lake Mining Company's stock has been added to the list. The par value of the stock is $25, and is quoted at $1 per share. At the gold mines work is being carried on as usual.

Although this has been the shortest month in the year, the production of the Ropes mine will exceed that of any month since the company started; the yield for the month of February being about $11,000 and for the year about $103,000, the entire product of the mine since opening will foot up about $272,000. The annual meeting of the company will be held March 10th, at the office of the secretary at Ishpeming, Mich.

At the Michigan Gold Company's mine, the snow is from four to five feet in depth, and the weather very cold, which would make an opening up of the mine under such conditions very expensive; and it has been thought advisable not to work a large force until spring, but to keep the mill in operation, working up the quartz from the dumps and from the surface of the vein, in connection with that taken out of the drifts which are being run from the deep shaft to the east and west, and before spring to work up two or three tons of very rich rock, conveying this money into the treasury, so as to have money on hand by spring to prosecute active mining work and developments and also to pay for such machinery as they will want to put in, whether in the shape of stamps and concentrating machinery, or to add additional Huntington mills of larger size. The working of the Huntington mill has been so far satisfactory, and by running this small mill the company can determine as to its value and adaptability to that work. The mill in February has been run on the lowest grade rock they have, none of the rich rock having been put in. There has been run through this mill about 145 tons of this rock. A clean-up made on March 1st shows the net output to be about $3,400 in gold. With this yield from the poorest rock added to it, the yield from the richer rock running will make the general average still more satisfactory.

Work at the Grayling and Gold Lake mines is being steadily prosecuted.

GOLD MINING STOCKS.

| Name of Company. | Par value. | Lowest. | High. |
|---|---|---|---|
| Grayling Gold & Silver Co. | $25.00 | $1.00 | $1.25 |
| Michigan Gold Co. | 25.00 | 3.50 | 4.00 |
| Peninsula Gold & Silver Co. | 25.00 | .... | .75 |
| Ropes Gold & Silver Co. | 25.00 | 2.25 | 2.50 |

IRON MINING STOCKS.

| Name of company. | Par value. | Bid. | Asked. |
|---|---|---|---|
| Ashland Iron Co. | $25.00 | .. .. | $65.00 |
| Aurora Iron Co. | 25 00 | 7.50 | 8.00 |
| Champion Iron Co. | 25 00 | $100.00 | 110.00 |
| Chandler Iron Co. | 25.00 | ..... | 43.00 |
| Chapin Iron Mining Co. | 25.00 | 25.00 | 33.00 |
| Chicago & Minn. Ore Co. | 100.00 | ..... | 125 00 |
| Cleveland Iron Co. | 25.00 | 20.25 | 21.50 |
| Germania | 25.00 | ..... | 12.00 |
| Jackson Iron Co. | 25 00 | 120.00 | 125.00 |
| Lake Superior Iron Co. | 25 00 | 66.00 | 68.00 |
| Milwaukee Iron Co. | 25.00 | 6.00 | 8.00 |
| Minnesota Iron Co. | 100.00 | 84.00 | 86.00 |
| Montreal Iron Co. | 25.00 | ..... | 9.00 |
| Norrie (Metropolitan) | 25.00 | ..... | 75.00 |
| Odanah Iron Co | 25.00 | ..... | 20.00 |
| Pittsburg Lake Angeline Co. | 25.00 | 170.00 | 175.00 |
| Republic Iron Co. | 25.00 | 49.00 | 50.50 |

### PIPE LINE CERTIFICATES.

(Specially Reported by Messrs. WATSON & GIBSON.)

Speculation continues to lag in petroleum, and though there has been something of a rebound from the bottom price, the break which took place last week has not brought any speculative buyers into the field, and the statistical showing has not yet been potent enough to induce any interest on the part of the outside public; and until this is done it is useless to have an opinion as to the future value.

NEW YORK STOCK EXCHANGE.

| | | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---|---|---|---|---|---|---|
| Mar. | 1. | 99⅛ | 99⅛ | 95 | 95⅝ | 231,000 |
| | 3. | 95⅛ | 96 | 92 | 94¾ | 353,000 |
| | 4. | 94⅛ | 95⅛ | 91¾ | 92¼ | 325,000 |
| | 5. | 92⅛ | 93⅛ | 92¼ | 93⅛ | 230,000 |
| | 6. | 93¼ | 94 | 93⅛ | 93½ | 160,000 |
| | 7. | 94 | 94⅝ | 94 | 94⅝ | 67,000 |
| Total sales in barrels | | | | | | 1,366,000 |

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

| | | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---|---|---|---|---|---|---|
| Mar. | 1. | 98¼ | 98¾ | 95½ | 95¾ | 109,000 |
| | 3. | 96 | 96 | 93⅛ | 94⅛ | 250,000 |
| | 4. | 94⅛ | 95¼ | 92½ | 93 | 244,000 |
| | 5. | 92¾ | 93⅛ | 92½ | 93 | 102,000 |
| | 6. | 93⅞ | 94 | 93 | 93½ | 153,000 |
| | 7. | 93⅞ | 95 | 93⅞ | 94¾ | 240,000 |
| Total sales in barrels | | | | | | 1,098,000 |

## COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 7.

### Statistics.

Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending March 1st, 1890, compared with the same period last year:

| Regions. | March 1. 1890. | March 2. 1889. | Difference. | |
|---|---|---|---|---|
| Wyoming Region Tons | 195,439 | 267,974 | Dec. | 72,535 |
| Lehigh Region " | 94,801 | 88,292 | Inc. | 6,509 |
| Schuylkill Region " | 149,195 | 114,108 | Inc. | 35,087 |
| Total | 439,435 | 470,374 | Dec. | 30,939 |
| Total for year to date | 4,232,715 | 4,769,024 | Dec. | 536,309 |

PRODUCTION OF BITUMINOUS COAL for week ended March 1st and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

| Tons of 2,240 lbs. | 1890. Week. | 1890. Year. | 1889. Year. |
|---|---|---|---|
| Phila. & Erie R.R. | 2,791 | 25,729 | 16 56 |
| Cumberland, Md | 57,068 | 661,921 | 477,563 |
| Barclay, Pa. | 3,208 | 21,202 | 23,169 |
| Broad Top, Pa. | 12,002 | 98,529 | 75,946 |
| Clearfield, Pa. | 76,180 | 717,423 | 553,587 |
| Allegheny, Pa. | 26,421 | 190,835 | 153,936 |
| Beach Creek, Pa. | 33,252 | 305,453 | 233,129 |
| Pocahontas Flat Top | 14,929 | 306,021 | 256,593 |
| Kanawha, W. Va. | 45,226 | 355,809 | 291,330 |
| Total | 281,077 | 2,682,922 | 2,081,821 |

WESTERN SHIPMENTS.

| | | | |
|---|---|---|---|
| Pittsburg, Pa | 18,833 | 152,012 | 110,633 |
| Westmoreland, Pa. | 39,821 | 312,621 | 288,971 |
| Monongahela, Pa. | 3,658 | 41,098 | 27,072 |
| Total | 62,312 | 505,731 | 426,676 |
| Grand total | 343,389 | 3,188,653 | 2,508,497 |

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending March 1st, and year from January 1st, in tons of 2,000 lbs.: Week, 96,945 tons; year, 967,704 tons: to corresponding date in 1889, 774,678.

### Anthracite.

About the only thing that would enliven the anthracite coal trade is a long-continued spell of cold weather, and as the winter season is already too far advanced to make this likely, the outlook for 1890 is not at all encouraging. The fact that the output is being reduced to a minimum shows that the producing companies realize that only through harmonious action can a firm market be re-established, and it is within their power to do this by limiting the production to the actual requirements. Notwithstanding the depressing conditions of the trade, we can see no reason, if the curtailment in production is continued, why steadier, if not higher, prices may not be obtained. There is quite a brisk demand for broken and steamer coal, and prices are generally pretty well maintained. On the 13th the meeting of the sales agents will take place, at which opening prices will be agreed upon. It is expected and to be hoped that these will be lower than they were last year. We may continue to quote, as last week, ruling prices for free burning to be: Broken, $3.40; egg, $3.50; stove, $3.60@$3.70; chestnut, $3@$3.25, and pea coal is in demand at $2.80, f. o. b., or $3 alongside.

The Lehigh Valley Railroad Company has a line surveyed from Bethlehem to Philadelphia, and has just bought for $300,000 a tract of land near Cramp's shipyards having a frontage on the Delaware River and extending along Richmond street, north of the Aramingo Canal. It also faces Beach street. The land may be reached by both the Reading and Pennsylvania railroads, and is available for terminal purposes at once by the Lehigh Valley. It is also on the line of the proposed Belt Line Railroad. The purchase of ground for terminal purposes is regarded in railroad circles as an indication that the Lehigh Valley will construct a line to Philadelphia. The distance from Philadelphia to Bethlehem is about forty miles.

The following is the statement of shipments fanthracite coal (approximate) for the week end-.ng March J, 1890, compared with same week last year:

| Regions. | 1890. | 1889. | Inc. | Dec. |
|---|---|---|---|---|
| Wyoming region | 195,439 | 267,974 | ..... | 72,535 |
| Lehigh region | 94,801 | 88,292 | 6,509 | ..... |
| Schuylkill region | 149,195 | 114,108 | 35,087 | ..... |
| Total | 439,435 | 470,374 | ..... | 30,939 |
| Total year to date | 4,232,715 | 4,769,024 | ..... | 536,309 |

### The New York Retail Coal Trade.

The regular semi-monthly meeting of the Retail Coal Exchange will be held this evening at eight P. M.

### Bituminous.

The bituminous coal trade is in quite a healthy condition, and a very large business may be expected this year, though there seems to be as little respect paid to the renewed pool obligations as to the recently proposed, but now quite defunct, coal agency government, and operators are selling at prices far different from those agreed upon, and without the slightest regard to the conditions necessary for supporting a reasonably profitable market for soft coal. The supply and demand are pretty evenly balanced, and, taken altogether, the outlook for the soft coal trade is rather encouraging.

Quite a considerable break in coastwise freights has occurred during the week. Baltimore freights have declined to $1.15 to New York and Sound ports and $1.25 to Boston and Portland, while the Philadelphia freights are down to $1 to Boston.

### Boston. March 6.

(From our Special Correspondent.)

The anthracite coal market continues in a state of suspended animation. We have had some winter weather here in the last two weeks, but it has served only to make business a little more active at retail. The wholesale market will show no appreciable signs of life until new prices are made. The present nominal rates are $3.40@$3.45 for broken, $3.50@$3.55 for egg, and $3.60@$3.65 for tove, f.o.b. at New York. There is, however, no market in reality, and terms are very variable, according to size of order and exigency of the seller.

The bituminous coal market is now very active. The Fitchburg Railroad have bought of J. C. Scott & Sons, and doubtless the Boston & Maine have contracted, though it is not announced as yet. The Hamilton Mills, of Lowell, have bought, and the Washington, of Lawrence, are reported as having bought. I mention these only as instances. In all probability at least 50 per cent. of the larger mill and railroad contracts are now out of the market. As for prices, I can only say that I am led to consider $2.60 f. o. b. as a purely nominal price, and think that several hundred thousand tons have been contracted for on a basis of $2.25 f. o.b., or in that immediate vicinity. The disposition of the smaller companies and individual operators is to let the two or three big "scoopers" go ahead and take all the business they can, and they will take the rest at and around $2.40@$2.50 f. o. b. The pool only exists in form.

Freights are even easier than when I last wrote, quoting $1.25 from Baltimore and $1.15 at Philadelphia. The New York rate ranges from 50 to 70 cents.

Retail trade is fairly active. Prices are unchanged, but there is a cloud in the sky. Castner & Curran are going into the retail business in this city. They have leased a large wharf, and will stock it before long. The large retailers here do not like the outlook, and the combination may come to an end before summer. The fact that the Philadelphia & Reading Company establishes a coal depot at Mystic from which peddlers will, presumably, be supplied is significant of the changes impending in the retail trade here.

The many friends of Mr. C. H. Sprague, Agent of the Chesapeake & Ohio Company, at Boston, will be glad to learn that his health is improved, and it is hoped that the improvement is not merely of a temporary character. Mr. Sprague has suffered much for several months past.

The receipts of coal at this port for the week are as follows:

| | For the week 1890. Tons. | For the week 1889. Tons. | For the year 1890. Tons. | For the year 1889. Tons. |
|---|---|---|---|---|
| Anthracite | 8,396 | 8,885 | 112,484 | 116,361 |
| Bituminous | 21,786 | 1,460 | 119,434 | 114,596 |
| Total | 30,182 | 10,345 | 231,918 | 230,957 |

### Buffalo. March 6.

(From our Special Correspondent.)

Anthracite coal unchanged in price. Several days of cold weather caused a brisk demand for fuel for domestic use.

Bituminous coal in good demand and the market firm at a shade higher quotations, say about 25c. per ton. Supply adequate for requirements of trade only; no accumulations reported.

Items are not plenty as usual; probably the following may prove interesting to some of your subscribers:

Inquiry of Messrs. Bell, Lewis & Yates elicited the information that no deal had been entered into for the purchase of the Sligo mines, alluded to in the ENGINEERING AND MINING JOURNAL of March 1st. Outsiders say that the company may have secured options on the eleven small mines, or "farmers' tanks" as they are called. Any way the matter turns out to be of little consequence.

Mr. Van Etten, the manager of the Car Service Association here, has no doubt but that in the very near future all the difficulties experienced in the working of the demurrage features of the association will be obviated, and shippers of coal and others will be perfectly satisfied. "Discipline must be observed," he says, "for the benefit of all interested." The bituminous coal shippers of our city have joined together for the purpose of concerted action, when necessary for their interests, and have started a "Bituminous Coal Association," with Mr. E. C. Roberts as chairman, Mr. W. H. Ball, secretary and treasurer, and Messrs. Charles Clifton, William D. Ward and Charles T. Hall, executive committee, and will meet daily until further notice, and watch the Car Service Association closely.

The Buffalo harbor appropriation of $400,000 for this year will, as usual, be cut down by Congress, which is pursuing a penny wise and pound foolish policy. Great injustice is done to our navigation interests by the smallness of the amount granted yearly.

The New York Central Railroad has added the following rule on its freight bills, evidently to carry out the car service idea: "If property is to be unloaded by the owner or consignee, the delivering carrier may make a reasonable charge per day for the detention of any car after the same has been held 48 hours for unloading, and may add such charge to the freight and advanced charges due, and hold said property subject to a lien therefor."

Six hundred men are at work constructing the 6,150 foot iron tube tunnel under the St. Clair river from Port Huron to Port Sarnia for railroad purposes. It is about half finished and over 2,400 feet will be under the bed of the river. The total length of tunnel and approaches will be over three miles.

The Lackawanna Transportation Company will not carry miscellaneous freight in their propellers to lake ports next season. Ore and coal will be the staple articles transported.

The work of buying the right of way for the Buffalo & Geneva Railroad is about finished; only a small portion of the eastern end remaining to be closed. Two years' time will be expended in the construction, so that the Lehigh Valley will be able to use its tracks in 1892 at the expiration of its lease with the Erie Railroad Company.

From the Lehigh Coal & Navigation Company's report for 1889 it appears that the earnings of the Lehigh & Susquehanna Railroad system, belonging to this company, were larger than those of any year excepting 1888. The quantity of coal transported was greater than ever before, but the revenue was smaller, as freight rates were less than in 1888. The coal production was 1,182,420 tons, which exceeds the output of any previous year, and the mines are in good condition and capable of an immediate increase in the output whenever demand justifies larger production.

### Pittsburg. March 6.

(From our Special Correspondent.)

**Coal.**—The situation remains about the same. The river shipments continue large. February shipments to Cincinnati, 3,974,000 bushels; to Louisville, 7,803,000; total, 11,777,000. The lower markets, particularly the markets below Cairo, are overstocked. Prices rule low at all points.

The nominal prices are:

| Per 100 bushels. | | Per 100 bushels. | |
|---|---|---|---|
| 1st pool | $4.75 | 3d pool | $3.90 |
| 2d pool | 4.50 | 4th pool | 3.25 |

Railroad coal, $5.20@$5.50.

**Connellsville Coke.**—There is a slight falling off in the demand; the range of prices are the same as previously agreed on; on account of the demand, certain of the heavy operators are running this week five instead of six days. Decline in shipment East, 106 cars; West, 715 cars; total, 821 cars. Week's shipments aggregate 6,810 cars; to Pittsburg and rivers, 1,825 cars; east of Pittsburg, 3,860; east of Connellsville, 1,425. Ovens active, 13,881; idle, 670 ovens.

Current rates: Furnace f.o.b. on cars at works, $2.15; Foundries, $2.45; Crushed, $2.65. Freights show no change. Pittsburg 70c.; Mahoney and Shenango Valley, $1.35; St. Louis, $3.05; Chicago, $2.75; Cleveland, $1.70; Cincinnati, $2.65; Louisville, $3.20.

## FREIGHTS.

**Freights on Ore from East St. Louis, Ill., to Natrona, Pa.**—The Wabash Railroad has just issued a new special commodity tariff from East St. Louis, Ill. On the tariff is a quotation on copper ore, low grade, carload 30,000 pounds, from East St. Louis to Natrona, Pa. at 16½ cents per 100 pounds. This is quite a cut from the old rate.

**From Baltimore to:** Boston, Mass., 1.25; Brooklyn, 115; Charleston, 1.00; Fall River, 1.15; Galveston, 3.00 New Bedford, 1.15; New Haven, 1.15; New York, N. Y., 1.15; Norfolk, Va., .65; Portland, 1.25; Providence, 1.15; Richmond, Va., .70; Salem, Mass., 1.25; Savannah, 1 15; Williamsburgh, N. Y., 1.15.

* And discharging. † Alongside. ‡ And towage.

## METAL MARKET.

NEW YORK, Friday Evening, March 7.

**Prices of silver per ounce troy.**

| Mar | Sterling Exch'ge. | Lond'n Pence. | N. Y. Cts. | Mar | Sterling Exch'ge. | Lond'n Pence. | N. Y. Cts. |
|---|---|---|---|---|---|---|---|
| 1 | 4.83½ | 44¼ | 96 | 5 | 4.85¼ | 44⅛ | 95⅞ |
| 3 | 4.83½ | 44⅜ | 96⅛ | 6 | 4.85⅛ | 44⅛ | 96 |
| 4 | 4.84 | 44¼ | * | 7 | 4.85¼ | 44 | 95⅝ |

*96 to 95¾.

Council Bills advanced ⅜d. on this week's allotment.

The silver market, as well as exchange, has been a fluctuating one of late, but the general tendency has been downward.

High money rates in Bombay keep up silver prices in London.

United States Assay Office at New York reports total receipts of silver for the week to be 63,000 ounces.

Dispatches from Pekin, China, announce that the Viceroy, Li Hung Chang, has formulated a project which will mark a new era in the Chinese commercial world. He has decided to establish a system of silver coinage, which shall be uniform throughout the Empire. The project is favorably viewed by the Prime Minister, Prince Chun, and has been submitted to the Emperor by memorial in the usual way, being urged by the Viceroy, the Prime Minister and most of the influential and progressive men.

I called at the Chinese Legation to inquire about the matter and was informed by one of the attachés, Hoshen Chee, who also acts as interpreter, that this question of a uniform coinage had long been under consideration, and that it was a pet scheme of the Viceroy, Li Hung Chang.

"Heretofore," he said, "we have had a copper currency, ranging in value from a mill to abou t

20 cents. The government has never issued paper currency, this privilege being entirely in the hands of private banking houses, who issued notes and bills of exchange. Of gold and silver coin of our own we have had none, but gold leaf and bars of gold as well as lumps of silver have been in use as measures of value, and when a merchant or trader desires money he could deposit them with private banking houses as collateral and get the notes of the banking houses to use in business.

At the seaports on the coast the English shilling, the Mexican dollar and the Japanese yen have come into general use, and this more than anything else has suggested the advisability of our having a silver currency of our own. I think the intention is to coin silver up to the value of $1, and the government also intends to grant charters to certain banking houses empowering them to issue paper currency, something on the order of your national bank system. It will greatly simplify business transactions, and will be an aid to commerce."

*Coinage Executed at the Mints of the United States.*—The following statement for February has been published:

| Denomination. | Pieces | Value. |
|---|---|---|
| Double eagles (total gold) | 78,000 | $1,560,000 |
| Standard dollars (total silver) | 3,488,000 | 3,488,000 |
| Five cents | 614,000 | 30,700 |
| One cent | 5,625,000 | 56.250 |
| Total minor | 6,239,000 | $86,950 |
| Total coinage | 9,805,000 | $5,134,950 |

*Stock of Gold and Silver Coin in the United States.*—Provisional monthly statement to March 1st 1890, issued by the Director of the Mint:

| Date. | Gold coin. | Silver coin. Full legal tender. | Silver coin. Subsidiary. |
|---|---|---|---|
| Last official statement, July 1st, 1889 | $614,068,360 | $333,502,650 | $76,601,836 |
| Gain or loss subsequent to above statement (estimate) | 11,898,869 | 22,923,351 | 107,056 |
| Estimate for March 1st, 1890 | $625,967,229 | $356,426,001 | $76,708,892 |
| Bullion at mints and assay offices (silver at coining rate) | Gold bullion. 66,133,725 | 5,082,414 | *6,074,537 |
| Total coin and bullion | $692,100,954 | $361,508,415 | $82,783,429 |

| | Total silver. | Total gold and silver coin. |
|---|---|---|
| Last official statement, July 1st, 1889 | $410,104,486 | $1,024,172,846 |
| Gain or loss subsequent to above statement (estimate). | 23,030,407 | 34,929,276 |
| Estimate March 1st, 1890 | $433,134,893 | $1,059,102,122 |

| | Silver bullion. | Total bullion. |
|---|---|---|
| Bullion at mints and assay offices (silver at coining rate) | 11,156,951 | 77,290,676 |
| Total coin and bullion | $444,291,844 | $1,136,392,798 |

* Trade dollar bullion.

### Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday reduced its minimum rate for discount from 5 to 4½ per cent. During the week the bank gained £148,000 bullion, and the proportion of its reserve to its liabilities was raised from 47·30 to 48·90 per cent. against a decline from 43·58 to 42·79 per cent. in the same week of last year, when its rate for discount was 3 per cent. The bank, on the 6th inst., gained £10,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 1,125,000 francs gold and an inrease of 1,875,000 francs silver.

### Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

| | Bid. | Asked |
|---|---|---|
| Trade dollars | $ .76 | $ 78 |
| Mexican dollars | .74½ | .76 |
| Peruvian soles and Chilian pesos | Nom'al. | Nom'al. |
| English silver | 4.83 | 4.88 |
| Five francs | .94 | .95 |
| Victoria sovereigns | 4.86 | 4.88 |
| Twenty francs | 3.86 | 3.90 |
| Twenty marks | 4.74 | 4.78 |
| Spanish doubloons | 15.55 | 15.70 |
| Spanish 25 pesetas | 4.82 | 4.88 |
| Mexican doubloons | 15.55 | 15.70 |
| Mexican 20 pesos | 19.50 | 19.60 |
| Ten guilders | 3.96 | 4.00 |

**Copper.**—The quiet but steady feeling which has characterized the copper market for some weeks past still continues. The demand for manufacturing purposes is quite satisfactory, but there is an entire absence of excitement and very little speculation. The business is undoubtedly in a very sound and healthy state, and quotations are well sustained, and consumer's orders come into the market with great regularity at ruling values. Quotations are unaltered since last week, and remain at 14¼@14½ for Lake ingots and 12¾@13 for casting qualities.

In the London market the easier tendency lately shown in the speculative market for Chili bars and G. M. Bs. has made further progress during the week, and the closing prices received by cable to-day, viz., £46 10s.@£46 12s. 6d. spot, and £47@£47 2s. 6d. three months, are the lowest figures touched this year. In the meantime, however, our reports from Europe all agree that although there has been a slight shrinkage in prices, the general consumptive demand remains satisfactory, and the finest sorts are becoming very scarce and command high prices. As the American trade is at present able to absorb the entire production of Lake copper for domestic purposes, the condition of affairs is likely to continue for some time to come, as very little fine copper is now being exported to Europe. The latest quotations in London are English tough, £53@£54; best selected, £55@£66; strong sheets, £62@£63; India sheets, £58@£60; yellow metal, 6d. per pound.

The exports of copper from New York during the last week were as follows:

| | | | |
|---|---|---|---|
| To Liverpool. | Copper matte. | Lbs. | |
| By S. S. The Queen | 1,886 sacks | 208,062 | $9,300 |
| To Mexico. | | | |
| By S. S. Niagara | 80 casks | 100,000 | 13,000 |
| To Rotterdam. | | | |
| By S. S. Azalia | 231 bars | 98,900 | 12,857 |

**Tin.**—The scarcity of spot tin continues, and high prices are obtained for immediate and early deliveries. Several saipments have arrived in port lately, but the greater part of such arrivals have gone immediately into consumption and never came into the market, being required to complete contracts previously made. The market for "futures" is also rather firmer, and prices have advanced about ⅛c. above the lowest figures touched. We quote: Spot, 20·75; March, 20½; April, 20·20; May, 20·15.

The London market opened very firm on Monday morning at £91 5s.@£91 7s. 6d. spot, and £92@£92 5s. three months, but relapsed the next day to £90 2s. 6d.@£90 5s. spot, and £91 2s. 6d.@£91 5s. three months, and during the remainder of the week the fluctuations have been unimportant and the latest quotations received by cable are: Spot, £90 5s.@£90 7s. 6d.; futures, £91 2s. 6d.@£91 5s. Our cable advices report that the shipments from the East during February amounted to a total of 2,500 tons.

**Lead.**—On Monday morning last a surprise was sprung on the market by the announcement (evidently inspired) in most of the morning newspapers that a big combination has been formed, including all the principal lead smelters in the country, of the nature of a Trust to counteract the influence of the existing "Lead Trust." Although the announcement referred to indicated that the new combination was virtually an accomplished fact, we are in a position to inform our readers that such is not the case, some of the larger smelters not having as yet agreed to unite in the manner desired. We believe there is a reasonable prospect of something of the kind being consummated, but we hardly think it is likely that an arrangement can be arrived at on the basis set forth in the recently published announcement just referred to. In the meantime the refiners are declining to make any quotations, and have altogether abstained from putting any metal on the market. As consumers have for some time past, in view of the dragging market, refrained from laying in any stocks, and have adopted the policy of simply buying at the market price from time to time to meet their recurring wants, the current reports and the action of the smelters have naturally influenced several holders of the metal to put prices up against the consumers, and the result has been that dealings have taken place at prices ranging between 3·90 and 4c., and the market closes to-day strong at the best prices touched.

A Washington dispatch says: In spite of the strong representations of Minister Ryan and Secretary Windom that it would seriously interfere with our commerce with Mexico, the Republicans of the Ways and Means Committee have agreed to place a duty of 1½ cents a pound on the lead in silver-bearing lead ore. Russell B. Harrison and Stephen B. Elkins, who have been at the capital a good deal lately, are credited with having brought this about with the aid of Secretary Blaine.

It is pretty well understood that this duty will be incorporated in the tariff bill, but since we are reliably informed a reciprocity treaty is being negotiated with Mexico which will let all ores in free, the placing of this duty in the general tariff act will have little effect, except to keep out British Columbia and some South American lead ores which now come in to a small extent.

*The Chicago Market.*—Messrs. Everett & Post, of Chicago, telegraph us as follows: Though quiet, lead rules firmer than last week, and the absence of large offerings is still noticeable at the close; 3·80c. is asked, and small sales reported at that.

*The St. Louis Market.*—Messrs. John Wahl & Co. telegraph us as follows: Our market continues to have elevating tendencies, offerings of all descriptions being very light. Sales since our last report will probably aggregate six hundred tons at from 3·67½ to 3·75. At the close no lead was obtainable below 3·75, and not a great deal at that.

**Spelter** remains flat, with quotations rather irregular. Nothing has lately been pressed for sale, however, and we have still to quote from 5·20 to 5.25.

Messrs. Henry R. Merton & Co., of London, have issued their statistics of the world's production of spelter in 1889. The figures are as follows:

| | Tons of 2,240 lbs. |
|---|---|
| Rhine District and Belgium | 134,648 |
| Silesia | 85,483 |
| Great Britain | 30,806 |
| France and Spain | 16,785 |
| Poland | 3,026 |
| Austria | 3,906 |
| United States | 53,562 |
| Total | 328,216 |

Average price ex ship London, £19 16s. 2d.

**Antimony.**—The demand continues good, at slightly lower prices. We now quote Cookson's at 24@25c., and Hallett's at 19¼@19½c.

**Nickel.**—Not much change has taken place and the price is about 75c.

**Quicksilver.**—There is a dearth of new features in quicksilver. It is steady at $50 in New York, and £9 10s. in London.

## IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 7.

The condition of the iron trade at this centre is not booming. Though prices are extremely satisfactory to makers the demand is not so active nor the confidence of buyers in the future so great as furnace men would like to see. It is undoubtedly true that there is a weakness rather than a stiffening in price, and while makers are holding very firmly as a rule to the standard prices, consumers are equally firm in demanding reductions and in some cases have gained them. Manufacturers who deal with such concerns as the Thomas Iron Company, and whose contracts really amount to but little, since they are supplied at the current market prices whatever they may have named in their contracts, are taking it easy and running on light stocks. Other manufacturers, while looking around in the trade to see what can be done, are not buying heavily in anticipation of their wants, but prefer waiting. It is, in fact, a waiting race, and the side that can hold out the longest is likely to win. For our part, we do not anticipate higher prices for some months to come, and it is probable that the present rates may be shaded before higher rates are obtained. We quote for No. 1 foundry, $19 @ $20; No. 2 X at $18 @ $19, and forge, $17 @ $18.

The anticipations of immense orders from Chicago for the fair do not as yet materialize, and in fact there seems to be some little difficulty in raising the money needed before any orders can be given.

Production throughout the country continues large, though not excessive, and it relieves all anxiety for the future in the minds of those who are bidding upon contracts.

**Scotch Pig.**—Nothing new is to be reported in this article; in fact, the amount of metal that is coming in is so small that it is scarcely worth making a separate item of it in our reports.

**Spiegeleisen and Ferro-Manganese.**—There is but very little demand for these articles, and prices are unchanged. We quote 20 per cent. spiegel at $35@36, and ferro at from $85@$93, according to date of delivery, spot being highest.

**Steel Rails.**—Some small sales have been effected in this market, mostly for the East, but business is light, with quotations 35 at Eastern mills, but with a probability of some reduction being obtained on large orders from desirable purchasers. No progress has been made in the question of the proposed reduction of the duty on steel rails. Whether it will be $10 or $15, has not yet been decided. At present the question is of no practical importance, and it is only with the view to the future when prices in Europe may come down and prices here may be kept up, that it is of any practical interest to our rail mills.

**Structural Iron and Steel.**—There have been no changes in prices, nor any marked improvements in the trade during the past week. The beam manufacturers held a meeting in Pittsburg last week, but made no changes in prices. The consumption of beams is large, unusually so for this season of the year, but the demand is very quiet; and trade, which two or three years ago would have appeared very large, now seems small and attracts no attention. Last year no less than 100,000 tons of beams were manufactured in this country, and the probability is that this large amount will be further increased this year. We continue to quote bridge plate, delivered on wharf, 2·30c.; iron angles, 2·30c.; iron tees, 2·80@2·85c.; steel angles, 2·70c.; beams and channels on wharf, 3·1c. Steel plates on wharf: Tank and ship, 2·75c.; shell, 3c.; flange, 3·25c.; fire-box, 4@4·1c. Iron plates on wharf: Common tank, 2·35c.; refined, 2·45c.; shell, 2·6c.; flange, 3·5@3·7c.; extra flange, 3¾@4c. Bar iron at mill is quoted at 1·9c. for common, and 1·9@2c. for refined. Deliveries from store are quoted as follows: Common, 2·1c. base; refined, 2·3c. base; "Ulster," 3c. base: Norway bars, 4c.; shapes, 5c., and Norway nail rods, 5½c.

**Merchant Steel.**—Merchant steel is quiet. Hope is expressed that prices will stiffen, but there are no indications of their so doing. Prices are as follows: Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2¾c.; open-hearth spring 2¾c.; tire steel, 2¾c.

**Rail Fastenings.**—There is little or nothing doing in this, and ruling prices may be quoted as follows: Spikes, 2·25c.; angle fish-plates, 2·15@2·25c.; bolts and square nuts, 3c.; hex. nut, 3·25c.

**Tubes and Pipes.**—A fair amount of business has been transacted, and prices continue to be maintained at the schedule rates. The ruling discounts on car lots are 45½ per cent. on small black, 40 on galvanized, 60 on large orders of black and 47 on large lots of galvanized; 45 on 1¾-inch boilers, 50 for 2- to 4-inch and 52½ on larger than 4-inch.

**Old Material.**—There have been very few transactions in these articles, double heads being held rather about the views of buyers; Ts are reported to have been sold at $25.50@$26, but we are unable to confirm this price. We quote $26@$26.50; $27 is a price at which rails have been offered and refused.

It is reported that the Allentown Iron Company sold 2,000 tons of old No. 1 iron at $18.50.

### Cleveland. March 6.

(From our Special Correspondent.)

Since my last report, dated Dec. 26th, 1889, a decided change has come in the market for pig iron and iron ore. There is a general lull in the demand, and inquiries are few. So marked a change from the buoyant activity of December and January is certainly disappointing to the speculatively inclined, but for the true interests of legitimate business this check in the advance of prices is decidedly beneficial.

If the present cold snap continues, the opening of lake navigation will be delayed, thereby lessening the time in which ore can be brought down; this will also tend to raise lake freights. Either one of these causes will stiffen the ore market.

Another favorable sign for the iron ore man is the reckless way in which some mines have sold up to the most extreme point of the amount which they estimate can be produced under the most favorable circumstances. Several mines which crowded their capacity last year have already sold from 50 per cent. to a 100 per cent. more than they then produced. It was estimated a month ago that 7,500,000 tons of this year's product had already been sold, or 300,000 tons more than the total shipments of 1889.

It would require but a few untoward circumstances, such as a short season of navigation, caves or accidents at the mine, labor strikes, crowded docks and railroads, thereby delaying discharge of boats, to make a shortage instead of a surplus.

Transactions have been very few since January, but prices of ores have not changed, and the confidence in the future is unimpaired.

Quotations are as follows:

| | | | |
|---|---|---|---|
| SPECULAR AND MAGNETIC ORES. | | | |
| Bessemer | 66@69 | per cent | $6.75@$7.50. |
| " | 60@64 | " | 5.25@ 6.50. |
| Non-Bessemer | 66@69 | " | 6.00. |
| " | 62@65 | " | 5.25@ 5.75. |
| " | 57@60 | " | 4.25@ 5.00. |
| SOFT HEMATITES, DRIED AT 212. | | | |
| Bessemer | 62@65 | per cent | $5.25@$6.00. |
| " | 59@61 | " | 5.00@ 5.25. |
| Non-Bessemer | 57@62 | " | 4.25@ 5.00. |

Above prices are delivered on docks at Lake Erie ports.

The Bethlehem Iron Company of Pennsylvania has decided not to purchase any Lake Superior ore this season owing to its high price. The ore would cost $4.50 at the mine, the lake and rail freights and other charges would be $3 more, making the total cost to the company $7.25 per ton. It is stated that the iron manufacturers of Eastern Pennsylvania can get their ore cheaper by importing it from Cuba and other foreign fields.

### Louisville. March 4.

(Special report by Messrs. HALL BROS. & CO.)

The market has been very quiet during the week under review. Trades have been confined mostly to quantities in carloads up to 200 and 300 ton lots. Buyers are still unwilling to buy ahead at the prices at which some of the furnaces are holding, and the result is that most of the trading has been in grades not controlled by the agreed prices. Some purchases of round quantities that have been contemplated by buyers have been abandoned, they believing they can do better by waiting.

| | | |
|---|---|---|
| *Hot Blast Foundry Irons.* | | |
| Southern Coke | No. 1 | $18.25@$18.75. |
| " " | No. 2 | 18.00@ 18.50. |
| " " | No. 3 | 17.50@ 17.75. |
| Mahoning Valley, Lake ore mixture | | 19.50@ 20.50. |
| Southern Charcoal | No. 1 | 18.50@ 19.00. |
| " | No. 2 | 18.00@ 18.50. |
| Missouri " | No. 1 | 19.00@ 19.50. |
| " " | No. 2 | 18.75@ 19.00 |
| *Forge Irons.* | | |
| Neutral Coke | | 17.00@ 17.50. |
| Cold Short | | 16.75@ 17.00. |
| Mottled | | 15.50@ 16.00. |
| *Car Wheel and Malleable Irons.* | | |
| Southern (standard brands) | | 23.50@ 24.00. |
| " (other brands) | | 19.50@ 20.50. |
| Lake Superior | | 23.00@ 23.50. |

### Philadelphia. March 6.

(From our Special Correspondent.)

**Pig Iron.**—Iron men who stop to philosophize on the situation in the iron trade, are at a loss to account for the downward tendency in pig iron at a time when there are no stocks in hand, and in the face of a very heavy spring demand which everyone says is sure to come. They argue that prices just now ought to point upward; and sellers say that all wise buyers ought to buy now. But buyers, whether wise or foolish, are not doing so. The fact is, that with the increased consumption since last summer and fall, buyers have about come to the conclusion that they are safe in their reliance upon the current output, and that this thing of buying ahead is all unnecessary. Their explanations are given for what they are worth. The most inquiry just now is for mill irons, and we have been told there is to be a booming demand. The extreme range of prices since Monday has been from $16.75@$17.50. The fact that some few lots of inferior iron have sold under $17 has been made the occasion of a good deal of talk about a break in forge iron: No. 2 is $18@$18.50, and strong; No. 1, $19@$20.50; Bessemer, $21@$21.50.

**Muck Bars.**—Muck bars are $31 to $31.50. The week's business has been light.

**Foreign Material.**—Eighty per cent. ferromanganese is worth wthin a trifle of $100. Twenty per cent. spiegeleisen is held at $35. Something better must be done if business is to be drawn out.

**Billets and Slabs.**—Buyers have once more disappeared from the market after keeping up quite an agitation for some six weeks, under which prices reached a point which became almost prohibitory. The reaction is now in full swing. Large buyers are endeavoring to take advantage of it, but the prices they offer are lower than manufacturers think they will go, considering the nearness of the spring trade. Quotations are $35 delivered for billets; nail slabs, $34.

**Blooms.**—Charcoal blooms sold at $53; anthracite, at $44; scrap, $35.50. These are fair average quotations.

**Merchant Iron.**—Small lots are bringing 1·90 to 2c. One or two large lots sold at 1·85. There has been some very close buying this week. The city mills are pretty busy. The Schuylkill Valley mills have been gathering more business than mills in other localities.

**Skelp Iron.**—There is no reason why skelp should fall off in demand; but buyers for a few days past have been doing nothing. Grooved is 1·90; sheared, 2·10.

**Wrought Iron Pipe.**—Prices are very strong for pipes and tubes, and casing rules a little firmer. Business is very good; mills are busy.

**Nails.**—Car lots sold at $2; there are some symptoms of further cutting. The car trade is near at hand, and naturally there is some vigorous competition to sell nails this way. Small lots, $2.20.

**Sheet Iron.**—There is no decline in demand, and no weakness in prices. Users of galvanized are figuring this week for the best rates on large lots. On account of the decline in raw material buyers are expecting and demanding some concessions.

Up to to-day they have not been made.

**Plate and Tank Iron.**—The efforts of three or four large buyers to buy to the best advantage, drew out some quotations this week, which look like a break in prices, but it was only the natural effort of manufacturers to pick up some desirable business. Tank is 2·25@2·30; shell, 2·50@2·60 for iron.

**Structural Iron.**—Anticipations have been at a high point for a week or two past, on account of the negotiations pending concerning large lots of structural iron. Negotiations are off for the present, and only small orders are coming in. Iron plate for bridge purposes, 2·25; angles, 2·30; tees, 2.80@2·90; beams and channels, 3·10.

**Steel Rails.**—Steel rails are quoted at $34.50 to $35.50. All orders are small. Competition is showing itself. Spring orders are slow. Railroad builders are holding off.

**Old Rails.**—Old rails are quoted at $25 to $25.50. A few lots have been sold a dollar higher for delivery within 100 miles of the city. Demand is not what it was two or three weks ago.

**Scrap Iron.**—No. 1 scrap is $24; machinery, $16; turnings, $16.50; old fish plates, $28 to $29.

### Pittsburg. Mar. 6.

(From our Special Correspondent.)

**Raw Iron.**—Dealers are still waiting for the improvement in demand and values that was expected to arrive about this time. So far, it has failed to put in an appearance, but that it will arrive in the near future is confidently predicted by parties that are well informed. The week's transactions have been the smallest recorded for some time. Former large purchasers have either held off or have purchased limited amounts, to be used as mixtures with material they have on hand. This manner of doing business will not last much longer, as, at the present rate of consumption, stocks in hands of consumers will soon be exhausted.

For some time past, the position of producers has certainly been a trying one, at the same time cost has advanced out of all proportion to selling price, and it is even hinted that a further advance is not far off. The confidence the trade has in regard to a corresponding advance in selling prices, is growing stronger; sellers are simply biding their time, and unless signs fail, they will not have to wait long. At present there is so little doing, that it is scarcely possible to do more than secure current rates, but there is a singular unanimity in regarding the position as being only temporary and preliminary to an advanee in values; the basis for this being the non-accumulation of stocks and the certainty that consumers will soon be on the market for fresh supplies. There is nothing to indicate any falling off in consumption, so that another movement such as was experienced last fall will be certain to produce similar results. In regard to the future, there is a wide difference of opinion; some well-informed persons bclieve that the present producing capacity will protect buyers against a further advance; others, also well-informed iron men, ridicule this view as entirely incorrect. So far as the indications on the surface, at present writing go to show, there will be a heavy and steady demand for all kinds of iron and steel products, but the course of prices will depend upon the volume of business placed within the next thirty days. Relative to these probabilities, there is nothing to be said that can be relied upon. Sales of iron continue to be made at various prices. City furnace made iron at all times commands the highest market price; outside lots often show a wide range in value. New steel rails are in good demand; trade in that department shows up well; orders plenty and outlook very acceptable.

| | | |
|---|---|---|
| *Coal and Coke Smelted Lake Ore.* | | |
| 2,000 Tons | Gray Forge, all ore | 19.00 cash. |
| 1,000 Tons | Bessemer | 22.00 cash. |
| 500 Tons | Gray Forge, City Furnace | 18.00 cash. |
| 500 Tons | Gray Forge, Extra | 18.25 cash. |
| 500 Tons | Gray Forge | 17.25 cash. |
| 400 Tons | Gray Forge | 17.25 cash. |
| 200 Tons | Bessemer | 22.50 cash. |
| 200 Tons | No. 1 Foundry | 19.80 cash. |
| 200 Tons | Gray Forge | 17.00 cash. |
| 50 Tons | No. 2 Foundry | 18.75 cash. |
| 50 Tons | Silvery | 18.50 cash. |
| 50 Tons | White and Mottled | 17.00 cash. |
| *Coke, Native Ore.* | | |
| 500 Tons | Gray Forge | 17.75 cash. |
| 200 Tons | Gray Forge | 17.50 cash. |
| 50 Tons | Silvery | 18.50 cash. |
| 50 Tons | Silvery Extra | 21.00 cash. |
| 30 Tons | No. 2 Foundry | 18.50 cash. |
| *Charcoal.* | | |
| 100 Tons | No. 1 Foundry | 26.00 cash. |
| 100 Tons | Cold Blast | 26.00 cash. |
| 50 Tons | No. 2 Foundry | 22.75 cash. |
| *Muck Bar.* | | |
| 500 Tons | Neutral | 29.50 cash. |
| 500 Tons | Neutral | 29.00 cash. |
| *Steel Slabs and Billets.* | | |
| 1,900 Tons | Billets | 35.00 cash. |
| 500 Tons | Billets | 35.50 cash. |
| 500 Tons | Billets | 34.50 cash. |
| 750 Tons | Slabs | 35.50 cash. |
| *Steel Wire Rods.* | | |
| 700 Tons | American Fives | 50.00 cash. |
| *Bloom Ends.* | | |
| 1,000 Tons | Bloom Ends | 24.75 cash. |
| 200 Tons | Bloom Ends | 25.00 cash. |
| *New Steel Rails.* | | |
| 2,500 Tons | New Rails—April | 35.50 cash. |
| *Ferro-Manganese.* | | |
| 50 Tons | 80 per cent. Pittsburg | 97.00 cash. |
| *Spiegel.* | | |
| 50 Tons | 20 per cent | 36.50 cash. |
| 75 Tons | 10 and 12 per cent | 32.00 cash. |
| *Silicon Spiegel.* | | |
| 50 Tons | 10 and 12 per cent | 60.00 cash. |
| 25 Tons | 15 per cent | 65.00 cash. |

EVANS.

### Prices.

| | | | |
|---|---|---|---|
| **Coke or Bituminous Pig—** | | 20% Spiegel at Pittsburg | $36.00@36.50 |
| Foundry No. 1 | $19.50@19.80 | Muck-Bar | 29.00@29.50 |
| Foundry No. 2 | 19.00@ | Steel Blooms | 35.00@35.50 |
| Gray F. No. 3 | 17.50@17.75 | Steel Slabs | 35.00@35.50 |
| " No. 4 | 17.00@17.25 | Steel Cr'p Ends | 25.00@ |
| White | 17.00@ | Steel Bl. Ends | 24.50@24.75 |
| Mottled | 17.00@ | Ferro-Man., 80% seaboard | 84.00@84.50 |
| Silvery | 18.25@21.00 | Steel Billets | 35.00@35.25 |
| Bessemer | 22.00@ | Old Iron Rails | 27.00@27.50 |
| Low Phos | 26.50@27.00 | Old Steel Rails | 22.50@23.00 |
| **Charcoal Pig—** | | No. 1 W. Scrap | 23.00@23.50 |
| Foundry No. 1 | 23.50@24.50 | No. 2 W. Scrap | @18.50 |
| Foundry No. 2 | 22.00@22.75 | Steel Rails | 35.50@36.00 |
| Cold-Blast | 25.00@29.00 | " light sec | 35.00@38.00 |
| Warm Blast | 24.00@25.00 | Bar Iron, nom. | 1.90@ 1.95 |
| 10 + 12% Spiegel at seaboard | 31.00@32.00 | Iron Nails | 2.25@ |
| | | Steel Nails | 2.25@ |
| | | Wire Nails | 2.85@ 2.90 |

## CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, March 7.

**Heavy Chemicals.**—The whole heavy chemical market has been strong during the past week. There is very little offering and very little demand. Cable advices report steadily increasing labor difficulties among the dockmen in Liverpool. Shipments will be stopped, and the probabilities are that all prices will go up.

In caustic soda the prices have already advanced till they are now for 60 per cent. $3@3.10; 70 per cent., $2.70@$2.75, and for 74-76 per cent., $2.65@$2.67½, with very little on the market.

In carbonated soda ash things continue as previously reported and quotations are for 58 per cent., $1.55@$1.60, while for the 48 per cent., variety, $1.50@$1.55 are the prices asked.

Caustic soda ash is still very quiet, with a firm market, $1.40 to $1.50 is asked.

Bleaching powder is dull and there is little demand for it. We report $1.40@$1.42½ as current prices.

No notable change in sal soda has occurred. For the imported article there has been some demand and not much sold. Quotations are 95c. to 97½c.

**Acids.**—The market for acids is dull. We have become so accustomed to large transactions there

that any ordinary volume of business scarcely uses a ripple in the trade. The manufacture of uper-phosphates and the refining of petroleum are the chief uses for sulphuric acid, and the first of these uses is steadily and rapidly increasing. The production of sulphuric acid in the United States in 1889 was probably about equivalent to 830,000 tons, the amount of sulphur used being about 216,000 or 217,000 tons, of which 136,000 tons were imported brimstone and 80,000 to 81,000 tons came from pyrites—domestic and imported.

The amount of pyrites produced here was about 84,000; and imported, 100,000.

The manufacture of acid is increasing rapidly, and will, no doubt, receive a still greater impetus from the utilization of the recently discovered phosphate deposits in Florida. It is said that the Standard Oil Company proposes using "sludge" acid in the manufacture of superphosphates. This would affect a large number in the trade, but the economy it would introduce in fertilizers would so extend their use as to increase the acid business.

On the other hand the production of petroleum seems to have passed its maximum and to be on the decline, so that the demand for sulphuric acid for this industry is likely to become less from year to year. We quote the acid combination prices 95 cents to $1.50 per 100 pounds for 60-degree acid, according to quantity.

The acid "Trust," so-called, denies having cut prices as stated in our report last week. They say it was not 42-degree nitric acid (quoted by the "Trust" at 6 to 6½ cents per pound), but 50-degree acid, which is rated usually at one cent a pound more than 42-degree acid, that they had offered for 4·95c. It is claimed that the "combine" does not regulate the price of 50-degree acid, and that therefore it can be offered at any price without "cutting" prices. This is a pretty slim defense, but we regret to say that we hear of representatives of the "combine" offering nearly all the articles on their list below schedule rates. If they can sell a 50° acid at the schedule rate of 40° nitric acid without violating their compact, there would seem to be need of concentrating the morals of the combine, which are altogether too dilute.

The market for oxalic acid shows no change either in volume of business or prices, we quote 6 to 6¼ cents.

**Fertilizing Chemicals.**—The usual condition of affairs in the fertilizing market for the time of the year continues, and we have but little to change in our last week's report. The spring trade is opening and orders are beginning to come in. The Northern consumers profess to be short of money and say that owing to poor crops, etc., they will not be able to buy as much this year as they did in 1889.

There is no doubt that such a state of affairs really exists in many farming communities; but dealers in fertilizers say that orders from early buyers are coming in as usual. It is too early to make any definite statement as to the future trade in this market with absolute certainty; but if the general opinion of dealers counts for aught in making a trade prediction, it may be safely said that trade in this market will be no less this year than in 1889. Dried blood is firmer, sales of high grade at $2, and low grade at $1.85@$1.90 for immediate delivery being reported; the orders having been received from the South. Ammoniates are firmer, otherwise the market remains about the same.

Ruling prices are as follows: Azotine, $1.95@$2; dried blood, low grade, $1.85@$1.90; high grade, $2. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $20@$21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.50. Fish scrap, $21.50@$22 per ton, f.o.b. factory. Sulphate of ammonia at $3.12½@$3.15 per cwt. Concentrated tankage, $1.90@$2.00. Refuse bone-black, guaranteed 70 per cent. phosphate, $20 per ton. Dissolved bone-black is 95c. per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kiln-dried, $6.75@$7 per ton, both f. o. b. vessels at the mines. Freights by sail from Charleston to New York, $3@$3.25 per ton. Charleston rock, ground $11.50@$12, ex-vessel at New York.

Double manure salts 48 to 51 per cent. sulphate of potash, $1.12½ per 100 pounds for shipments after April 1st; high grade manure salts, basis 90 per cent. sulphate of potash, $2 37½ per 100 pounds. For lots on the spot, an advance over the above-named figures of 2½c. per 100 pounds is quoted.

Kainit.—Our last week's report covers all that can be said of this article. There is practically none here and quotations are nominally $10.50.

Muriate of Potash.—Three hundred tons arrived during the week and were disposed of immediately. There is a fair jobbing demand, and prices continue at $1.80.

Brimstone.—Nothing new in brimstone has developed, and this product is quoted at $18.75 for best unmixed seconds and $18.25 for best unmixed thirds. Figures showing exports during February from Sicily to this country have not yet been received.

Nitrate of Soda.—The downward tendency in the prices of nitrate continues, and the large auction sale reported was not calculated to check it. Quotations are now $1.80 for spot, and $1.75 for future delivery, the recent large receipts being responsible for the decline.

Mr. E. B. Nichols sends us the following statistics issued under date of March 1st:

| | 1890. | 1889. | 1888. |
|---|---|---|---|
| Stocks in store and afloat in Atlantic ports, Feb. 15, bags... | 85,151 | 63,994 | 59,563 |
| Arrivals ..... | 46,120 | 23,980 | 8,505 |
| | 131,271 | 87,974 | 68,068 |
| Previously reported, 98,076; total arrivals to date, 144,196; same time, 1889, 74,870; same time, 1888, 52,169. | | | |
| Stocks..... | 90,484 | 75,898 | 62,781 |
| To arrive, 462,000; visible supply, 552,484; same time, 1889, 319,898; same time, 1888, 341,053. | | | |
| Stocks with dealers in store and afloat here: | | | |
| Deliveries fortnight ending March 1..... | 40,787 | 12,076 | 5,287 |
| Previously reported..... | 64,651 | 72,896 | 47,541 |
| Total deliveries to March 1..... | 105,438 | 84,972 | 52,828 |
| Sales, spot..... | @ 1.75 1.80 | @ 2.35 2⅝ | @ 2.10 2.20 |

"The event of the fortnight was the auction sale of the cargo in store, ex 'Wauchusett,' 17,274 bags, at $1.67½@$1.71½. The market is dull and in favor of buyers. The failure on the producers' meeting at Iquique to agree on apportionment caused a fall in value on the coast and in Europe. All markets are glutted, and speculation is restrained in view of the excessive supply. The arrivals were 'R. R. Thomas' at this port, 'Carrie Winslow' at Philadelphia, 'Herbert Black' at Charleston and 'Sintram' at Boston. The coast exports in Febraury were 7,000 tons to America and 55,000 tons to Europe."

### The English Fertilizer Market.

(Messrs. Couper, Millar & Co.'s report.)

LONDON, Feb. 17, 1890.

Business generally has been somewhat dull during the past month, doubtless owing to the "influenza," and dear money. The fertilizer market has, however, ruled steady, prices being well supported. In our circular of Dec. 16th last, we spoke of newly-discovered phosphate deposits, referring partly to those in Florida (See ENGINEERING AND MINING JOURNAL, Feb. 8th, for a description of the Phosphate Beds of Florida), from whence, it seems, supplies will come at no distant date; still it takes time to develop an enterprise of this description, and shipments of importance cannot be looked for this year.

Mineral Phosphates.—South Carolina wanted, but we hear of no sales. Canadian 80 per cent. sold at equal to 16d., with ½th rise basis London delivery. We hear of no sales of lower tests. Somme 70 to 75 per cent. selling at equal to 1s. 3¾d., London terms, and 75 to 80 per cent. at 1s. 5¼d., with rise, and but little on the market. Belgian scarce, and only a little, 40 to 45 per cent., and 45 to 50 per cent. available. Aruba and Curaçoa off the market. Cambridge about 50s., but nothing offering.

Bone Ash, Bones and Meal.—Ash inquired for, but buyers of bones seem to be filled up. Bone meal dull, and last sale reported was at £5 5s.

Sulphate of Ammonia quoted $11 17s. 6d to £12.

Nitrate of Soda at £8 5s. spot for ordinary, £8 10s. refined.

Ammoniacal Materials—Fish guano commands 10s. and 1s. 3d. in buyers' bags; ground hoofs and horns, 9s. 6d. to 10s. per unit; dried blood not so much wanted, and price nominal.

Muriate of Potash.—We quote at £7 12s. 6d. on 80 per cent in bags. Kainit at 32s. in bags or 28s. 6d. in bulk f. o. b. Hamburg in lots of not less than 50 tons. Net cash. Stassfurt weights and sampling.

## BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, March 7.

**Brick.**—There is a good supply of bricks and the market is weaker. For best grades of Haverstraw brick, quotations are $7.50@$7.75; Haverstraw seconds and "uprivers," $7@$7.25. Jerseys are $6@$7, an increase over last week. and pale continue at $3.50@$4.00 per thousand.

**Lime.**—There is no change whatever in the condition of this branch of the building material market, and small supplies continue. Sailing vessels encountered heavy gales and adverse winds, and the result is that there is very little Maine lime on the way. A prominent dealer graphically describes the market as being "hungry, very hungry," and further adds that he spends his time in dodging those customers to whom he had promised lime. The prices being those fixed by the combination of manufacturers in the Rockland, Rockport and Thomaston districts, continue unchanged as follows:

Rockland common, $1.00 per bbl.; Rockland finishing, $1.20; St. John common and finishing. 90@95c.; Glens Falls common and finishing, 85c. @$1.11.

NOTES OF THE WEEK.

At the recent convention of brickmakers in Philadelphia Mr. J. W. McCrary proposed a change in the names of various grades of bricks, which seems a very sensible suggestion. Instead of "red brick," "pale red brick," "dark salmon" and "light salmon," he would designate them as follows: For hard brick, *H. A.*, or "hard arch," and *S.* for "salmon." The brick next above the arches would be No. 1 *H.*, or so-called pavers. above these would come the No. 2 *H.*, No. 3 *H.* then *S.* For the best quality of front brick he would suggest *B. Q. F.*; for a second quality, 2d *Q. F.*, etc.

A strike of bricklayers, stone masons, carpenters, painters, plasterers, and other building trades organizations, embracing Wheeling, W. Va., and all the surrounding towns, began on the 1st instant, and all building operations are at a standstill. The trouble was brought about through the resistance of the contractors to a demand by the stone masons for $3.50 a day, instead of $3.25. The carpenters became involved in the strike, and the other trades followed.

## IMPORTS AND EXPORTS OF METALS AT NEW YORK FEBRUARY 22 TO MARCH 1 AND FROM JANUARY 1.

### IMPORTS.

| Spelter. | Week. Tons. | Year. Tons. |
|---|---|---|
| Amer. Metal Co.... | | 25 |
| Meyer, G. A. & E.. | | 9 |
| Muller, Schall & Co.... | | 69 |
| Total..... | | 103 |
| Corres. date, 1889.. | | 56 |
| **Pig Lead.** | **Lbs.** | **Lbs.** |
| Schultz & Co., A.. | | 98 |
| Total..... | | 98 |
| Corres. date, 1889.. | | ..... |
| **Tin.** | **Tons.** | **Tons.** |
| Abbot, Jere, & Co. | 25 | 25 |
| Amer. Metal Co.... | 75 | 225 |
| Crooks & Co., R.... | | 25 |
| Hendricks Bros.... | 20 | 20 |
| Lehmaier, S., & Co. | 10 | 10 |
| Naylor & Co..... | 50 | 200 |
| Nissen, Geo..... | | 10 |
| Phelps, Dodge & Co. | 130 | 500 |
| Thomson, A. A. & Co.... | | 10 |
| Townsend, & Co., J. R.... | | 30 |
| Trotter & Co, N.. | 25 | 50 |
| Total..... | 280 | 1,050 |
| Corres. date, 1889.. | | 1,370 |
| **Tin Plates.** | **Boxes.** | **Boxes.** |
| Bruce & Cook..... | 533 | 11,404 |
| Byrne & Son..... | | 1,000 |
| Central Stamp. Co. | 1,524 | 22,521 |
| Coddington & Co... | 1,898 | 16,833 |
| Cohn & Co ..... | 431 | 1,745 |
| Con. Fruit Jar Co. ..... | | 120 |
| Corbiere F. & Co.... | | 1,193 |
| Cort & Co..... | | 24,767 |
| Crooks & Co..... | 587 | 5,470 |
| Dickerson, V. D. & Co. | 364 | 34,763 |
| Haberman, F.... | | 66 |
| Iron Clad Mfg. Co. ..... | | 277 |
| Lalance & G. M. Co. ..... | | 1,734 |
| Lehmaier, Schw'z & Co.... | | 200 |
| Merchant & Co..... | 219 | 5,725 |
| Mersick & Co.. .. ..... | | 1,426 |
| Morewood & Co.... | 1,000 | 23,563 |
| Pratt Mfg. Co..... | 700 | 23,047 |
| Phelps, Dodge & Co ..... | | 80,021 |
| Shepard & Co..... ..... | | 789 |
| Taylor, N. & G.... ..... | | 234 |
| Thomson & Co., A. A. | 1,000 | 8,141 |
| Warren, J. M..... ..... | | 545 |
| Wheeler & Co..... ..... | | 3,680 |
| Whittemore & Co. | 545 | 2,035 |
| Wolff & Reesing... ..... | | 625 |
| Total..... | 8,801 | 266,655 |
| Corres. date, 1889.. ..... | | 375,963 |
| **Pig Iron.** | **Tons.** | **Tons.** |
| Crocker Bros..... ..... | | 200 |
| Stetsson & Co., G. W..... . | | 100 |
| Williamson, J. & Co. ..... | | 200 |
| Total..... ..... | | 500 |
| rres. date, 1889.. ..... | | 3,905 |

| Steel Blooms, Billets, and Slabs. | Tons. | Tons. |
|---|---|---|
| Dana & Co..... . ..... | | 502 |
| Downing, R. F. & Co. ..... | | 5 |
| Martin & Co .... ..... | | 80 |
| Milne, A., & Co.. .. ..... | | 16 |
| Pope, Jas. E., Jr.... ..... | | 61 |
| Roebling's Sons, J. A..... | | 55 |
| Wolff, & Co., R. H. ..... | | 60 |
| Total..... ..... | | 779 |
| Corres. date, 1889... ..... | | 6,618 |
| **Bar Iron.** | **Tons.** | **Tons.** |
| Abbott & Co., Jere. ..... | | 353 |
| Bacon & Co..... ..... | | 84 |
| Crocker Bros..... ..... | | 77 |
| Downing & Co..... ..... | | 145 |
| E. J. Jacobus. ..... ..... | | 1 |
| Lilienberg, N..... ..... | | 235 |
| Milne & Co..... ..... | | 234 |
| Muller, Schall & Co. | 200 | 200 |
| Page, Newell & Co.. ..... | | 452 |
| Wilson, J. G..... ..... | | 2 |
| Total..... | 200 | 1,603 |
| Corres. date, 1889... ..... | | 1,589 |
| **Scrap Iron.** | **Tons.** | **Tons.** |
| Samper & Co., S. ..... | | 186 |
| Ward, J. E. & Co.. | 15 | 15 |
| Total..... | 15 | 201 |
| Corres. date, 1889... ..... | | 1,103 |

| Steel and Iron Rods. | Tons. | Tons. |
|---|---|---|
| Abbott & Co..... ..... | | 1,828 |
| American S. Co.... ..... | | 225 |
| Bacon & Co..... ..... | | 22 |
| Carey & Moen..... | 24 | 42 |
| Downing & Co..... ..... | | 44 |
| Galpin, S. A..... ..... | | 536 |
| Greely & Co. C. S. ..... | | 30 |
| Hazard Mfg. Co.. . | | 12 |
| Jacobus, E. Y..... ..... | | 2 |
| Lundberg, G..... ..... | | 110 |
| Milne & Co..... ..... | | 180 |
| Muller, Schall & Co. ..... | | 100 |
| Naylor & Co..... ..... | | 779 |
| Page, Newall & Co. ..... | | 202 |
| Roebling's Sons, J. A..... | | 612 |
| Schulze, P. R ..... .. ... | | 1 |
| Wood & Niebuhr.. ..... | | 25 |
| Wolf & Co., R. H.. ..... | | 1,610 |
| Total..... | 24 | 5,624 |
| Corres. date, 1889.. ..... | | 9,414 |
| **Old Rails.** | **Tons.** | **Tons.** |
| Frankfort, M..... ..... | | 1,339 |
| Hernsheim, E .... ..... | | 350 |
| Total..... ..... | | 1,689 |
| Corres. date, 1889.. ..... | | 4,741 |
| **Spiegeleisen.** | **Tons.** | **Tons.** |
| Blakely & McLellan..... | | 1,504 |
| Crocker Bros..... .. ..... | | 2,942 |
| Dana & Co..... . ..... | | 2,296 |
| Foley, F..... ..... | | 50 |
| Geisenheimer & Co..... | | 12 |
| Hernshime, L..... ..... | | 3,184 |
| Naylor & Co..... ..... | | 2,384 |
| Perkins, C. L..... ..... | | 400 |
| Sachs & Richmond. | 2 | 2 |
| Whittemore, H. & Co. ..... | | 23 |
| Total..... | 2 | 11,210 |
| Corres. date, 1889... ..... | | 13,348 |
| **Iron Ore.** | **Tons.** | **Tons.** |
| Baiz, Jacob..... ..... | | 67 |
| Earnshaw, A..... | 602 | 1,737 |
| Ennis, Andrew.... ..... | | 438 |
| Total..... ..... | 602 | 2,242 |
| Corres. date, 1889.. ..... | | 749 |

### EXPORTS.

| Copper. | Pounds. | Pounds. |
|---|---|---|
| Abbott & Co., Jere. ..... | | 675,443 |
| Amer. Met. Co., Lt. ..... | | 648,110 |
| Belmont, Aug. & Co ..... | | 229,766 |
| Burgass & o..... | 72,328 | 72,328 |
| Wil'ms & T'hune.. ..... | | 112,004 |
| Total..... .... | 72,328 | 1,755,651 |
| Corre. date, 1889.. ..... | | .... . |
| **Copper Matte.** | | |
| American Metal Co ..... | | 973,377 |
| Lewisohn Bros.. .. ..... | | 502,162 |
| Nichols, Geo. H... ..... | | 267,202 |
| Paulsen, Wm.... ..... | | 1,039,428 |
| Wil'ms & T'hune.. ..... | | 1,716,310 |
| Total ..... ..... | | 4,588,479 |
| Corres date 1889... ..... | | ..... |

## DIVIDEND-PAYING MINES

| | Name and Location of Company. | | Capital Stock. | Shares. No. | Par | Assessments. Total levied | Date and amount of last | | | Dividends. Total paid. | Date and amount of last | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Adams & L. | Colo. | $1,500,000 | 150,000 | $10 | * | .... | .... | .... | $555 000 | Jan. | 1887 | .15 |
| 2 | Alice, S. C. | Mont | 10,000,000 | 400,000 | 25 | * | .... | .... | .... | 80 0,000 | Dec. | 1889 | .06¼ |
| 3 | Alma Cons., G. | Idah | 300,000 | 30,000 | 10 | * | .... | .... | .... | 60,000 | Jan. | 1 89 | .50 |
| 4 | Amerlean & Nettie, C. | Colo | ..... | 300,000 | .... | .... | .... | .... | .... | 150,000 | Nov | 1889 | 10 |
| 5 | Amy & Silversmith, S. | Mon. | ..... | 344,419 | .... | .... | .... | .... | .... | 247.530 | Aug. | 1887 | 12½ |
| 6 | Atlantic, C. | Mich | 1,000,000 | 40,000 | 25 | $280,000 | Apl. | 1878 | $1.00 | 620,000 | Feb. | 1890 | 1.50 |
| 7 | Argenta, S. | Nev. | 10,000,000 | 100,000 | 100 | 330,000 | July | 1880 | .10 | 40.000 | Feb. | 1890 | .20 |
| 8 | Aspen Mg. & S., S. L. | Colo. | 2,000,000 | 200,000 | 10 | * | .... | .... | .... | 380,000 | Mar. | 1890 | .10 |
| 9 | Aurora, I. | Mich | 2,000,000 | 100,000 | 20 | * | .... | .... | .... | 155,000 | Oct. | 1887 | 1.87½ |
| 10 | Badger, S. | Oct | 250,000 | 50,000 | 5 | .... | .... | .... | .... | 25,000 | Jan. | 1890 | .25 |
| 11 | Bassick, G. S. | Colo. | 10,000,000 | 100,000 | 100 | * | .... | .... | .... | 400,000 | Mar. | 1884 | 1.00 |
| 12 | Belle Isle, S. | Nev. | 10,000,000 | 100,000 | 100 | 155 000 | Apl. | 1889 | .10 | 300,00 | Dec | [illegible] | .25 |
| 13 | Belcher, G. S. | Nev. | 10,400,000 | 104,000 | 100 | 2,822,000 | Feb | 1889 | .60 | 15,397,200 | Apl | 1876 | 1.00 |
| 14 | Bellevue Idaho, S. L. | Idah. | 1,250,000 | 125,000 | 10 | 120,000 | Dec. | 1889 | 25 | 187.500 | Jan | 1887 | .10 |
| 15 | Bodie Con., G. S. L. | Cal. | 10,000 000 | 100 000 | 100 | 575,000 | Nov | 1889 | 25 | 1,295,000 | Apl. | 1885 | .50 |
| 16 | Boston & Mont, G. | Mon | 2,500,000 | 250,000 | 10 | * | .... | .... | .... | 530.000 | Jun | 1886 | .10 |
| 17 | Boston & Mont., C. S. | Mon | 2,500,000 | 100,000 | 25 | * | .... | .... | .... | 1,100,000 | Feb | 1890 | 1.00 |
| 18 | Breece, S. | Colo | 5,000,000 | 200,000 | 25 | * | .... | .... | .... | 2,000 | Feb. | 1890 | .01 |
| 19 | Brooklyn Lead, L. S. | Utah | 500,000 | 50,000 | 10 | .... | .... | .... | .... | 127,000 | July | 1887 | .05 |
| 20 | Bulwer, G. | Cal | 1,000,000 | 100,000 | 10 | 130,000 | Aug. | 1889 | .25 | 175 000 | Jan. | 1884 | .10 |
| 21 | Bunker Hill & Sull. | Idah. | 3,000,000 | 300,000 | 10 | * | .... | .... | .... | 150.000 | Oct. | 1883 | .06¾ |
| 22 | Caledonia, G. | Dak. | 10,000,000 | 100,000 | 100 | 505,000 | May | 1885 | .15 | 136,000 | Oct | 1889 | .08 |
| 23 | Calliope, S. | Colo. | 1,000,000 | ¶ | 1 | .... | .... | .... | .... | 70,000 | Feb. | 1890 | .01 |
| 24 | Calumet & Hecla, C. | Mich | 2,500,000 | 100,000 | 25 | 1,200,000 | .... | .... | .... | 33,850,000 | Feb. | 1890 | 5.00 |
| 25 | Carbonate Hill, S. L. | Colo. | 1,500,000 | 300,000 | 10 | * | .... | .... | .... | 80,000 | Apl. | 1884 | .05 |
| 26 | Carlisle, G. | N. M. | 1,000,000 | 200,000 | 5 | .... | .... | .... | .... | 175,000 | Dec. | 1888 | .12½ |
| 27 | Castle Creek, G. | Idah. | ..... | 100,000 | 100,000 | 1 | .... | .... | .... | .... | 51,000 | Dec. | 1883 |
| 28 | Cataipa, S. L. | Colo. | 3,000,000 | 300,000 | 10 | * | .... | .... | .... | 270,000 | May. | 1884 | .10 |
| 29 | Central, C. | Mich | 500.000 | 20.000 | 25 | 100,000 | Sept | 1861 | .06 | 1,050,000 | Feb. | 1890 | 1.00 |
| 30 | Chrysolite, S. L. | Colo. | 10,000,000 | 200,000 | 50 | * | .... | .... | .... | 1,650,000 | Dec | 1884 | .25 |
| 31 | Colorado Central, S. L. | Colo. | 2,750,000 | 275,000 | 10 | * | .... | .... | .... | 127,000 | July | 1889 | .05 |
| 32 | Confidence, S. L. | Nev. | ..... | 24,000 | .... | 287,440 | Apl. | 1887 | .50 | 406.250 | Apl. | 1889 | 1.00 |
| 33 | Cons. Cal. & Va., G. S. | Nev. | 21,000,000 | 210,000 | 100 | 108,000 | Jan. | 1885 | .20 | 199.380 | Jan. | 1890 | .50 |
| 34 | Contention, S. | Ariz. | 12,500,000 | 250,000 | 50 | * | .... | .... | .... | 3,358,800 | Jan. | 1884 | .25 |
| 35 | **Cop. Queen Cons, C. | Ariz. | 1,400 000 | 140,000 | 10 | * | .... | .... | .... | 12,587,000 | Feb. | 1889 | .50 |
| 36 | Crescent, S. L. G. | Utah | 15,000,000 | 600,000 | 25 | * | .... | .... | .... | 2 0,000 | Oct. | 1888 | .03 |
| 37 | Crown Point, G. S. | Nev. | 10 000 000 | 100,000 | 100 | 2,850,000 | Sept | 1880 | .50 | 328,000 | Jan. | 1875 | 2.00 |
| 38 | Daly, S. L. | Utah | 3,000,000 | 150,000 | 20 | * | .... | .... | .... | 11,584 000 | Feb | 1890 | .25 |
| 39 | Deer Creek, S. | Idah. | 1 000,000 | 200,000 | 5 | * | .... | .... | .... | 1,387,500 | Jun. | 1889 | .05 |
| 40 | Deadwood-Terra, G. | Dak. | 5,000,000 | 200,000 | 25 | * | .... | .... | .... | 20,000 | Nov. | 1887 | .10 |
| 41 | Derbec B. Grav., G. S. | Cal. | 10,000,000 | 100,000 | 100 | 90,000 | Dec. | 1881 | .10 | 11,000,000 | Oct | 1889 | .10 |
| 42 | Dunkin, S. L. | Colo. | 5,000,000 | 200 000 | 25 | * | .... | .... | .... | 210.000 | Sept | 1889 | .05 |
| 43 | Dunstone, G. S. L. | Mont | 1,000,000 | 200,000 | 5 | * | .... | .... | .... | 390,000 | Nov. | 1888 | .03 |
| 44 | Eclipse. | Colo. | 100,000 | 100,000 | 1 | * | .... | .... | .... | 8,000 | Nov. | 1887 | .10 |
| 45 | Elknorn, G. S. | Mon | 1,000,000 | 100,000 | 10 | 50,000 | July | 1883 | .50 | 20,000 | July | 1887 | .05 |
| 46 | Empire L. | Mont | 500,000 | 50,000 | 5 | * | .... | .... | .... | 170,000 | Oct. | 1887 | .37½ |
| 47 | Eureka Con., G. S. L. | Nev. | 5,000,000 | 50,000 | 100 | 550,000 | Jun. | 1889 | .50 | 70.500 | Feb. | 1888 | .25 |
| 48 | Evening Star, S. L. | Colo. | 500,000 | 50,000 | 10 | * | .... | .... | .... | 4,955.000 | Dec. | 1889 | .25 |
| 49 | Excelsior, G. | Cal. | 10,000,000 | 100,000 | 100 | 580,000 | Sept | 1885 | 1.00 | 1,450,0 0 | Oct. | 1880 | .25 |
| 50 | Father de Smet, G. | Dak. | 10,000,000 | 100 000 | 100 | 200,000 | Nov | 1878 | 1.00 | 875,000 | Dec | 1885 | .20 |
| 51 | Franklin, C. | Mich | 1,000,000 | 40,000 | 25 | 220,000 | Jun. | 1871 | .... | 1,125.000 | Jan. | 1889 | 2.00 |
| 52 | Freeland, G. S. C. | Colo. | 5,000,000 | 200,000 | 25 | * | .... | .... | .... | 930,00 C | July | 1886 | .10 |
| 53 | Garfield Lt., G. S. | Nev. | 500,000 | 50,000 | 5 | .... | .... | .... | .... | 190,000 | Apl. | 1888 | .12½ |
| 54 | Gould & Curry, G. S. | Nev. | 10,800,000 | 108,000 | 100 | 4,434,000 | Oct. | 1889 | .30 | 85,000 | Oct | 1870 | 10.00 |
| 55 | Grand Prize, S. | Nev. | 10,000,000 | 100,000 | 100 | 715,000 | Nov. | 1882 | .30 | 826,800 | Jan | 1880 | .30 |
| 56 | Granite, S. L. | Idah. | 500,000 | 500,000 | 1 | * | .... | .... | .... | 525.000 | Oct. | 1889 | .02 |
| 57 | Granite Mountain, S. | Mont | 10,000,000 | 400,000 | 25 | * | .... | .... | .... | 28 4 0 | Feb | 1890 | .50 |
| 58 | Green Mountain, G. | Cal. | 1,250,000 | 125,000 | 10 | * | .... | .... | .... | 8 200,000 | Nov. | 1881 | .07½ |
| 59 | Hale & Norcross, G. S. | Nev. | 11,200,000 | 112,000 | 100 | 5,086,000 | July | 1887 | .50 | 212.000 | July | 1888 | .50 |
| 60 | Hecla Con., S. & L. C. | Mont | 1,500,000 | 30,000 | 50 | * | .... | .... | .... | 1,102,000 | Dec. | 1889 | .50 |
| 61 | Hel'a Mg & Red, G. & L. | Mont | 3,315,000 | 663,000 | 5 | * | .... | .... | .... | 1,437.500 | July | 1886 | .06 |
| 62 | Holmes, S. | Nev. | 10,000,000 | 100,000 | 100 | 300,000 | Sept | 1885 | .10 | 197.97) | Apl. | 1886 | .25 |
| 63 | Holyoke, G. | Utah | 200,000 | 200,000 | 1 | * | .... | .... | .... | 75,000 | Feb. | 1883 | .10 |
| 64 | Homestake, G. | Dak. | 12,500,000 | 125,000 | 100 | 200,000 | July | 1878 | 1.00 | 427.000 | Feb. | 1890 | .10 |
| 65 | Honorine, S. L. | Utah | 500,000 | 250,000 | 2 | 37,500 | Apl. | 1889 | .05 | 4,506,250 | Sept | 1887 | .05 |
| 66 | Hope, S. | Mont | 1,000,000 | 100,000 | 10 | * | .... | .... | .... | 125.000 | Apl. | 1888 | .25 |
| 67 | Horn-Silver, S. L. | Utah | 10.000.000 | 400,000 | 25 | * | .... | .... | .... | 233,252 | Dec. | 1889 | .12½ |
| 68 | Hubert, G. | Colo. | 1,000,000 | 1 mil'n | 1 | * | .... | .... | .... | 4,050,000 | Dec. | 1889 | .00½ |
| 69 | Idaho, G. | Cal. | 310,000 | 3,100 | 100 | .... | .... | .... | .... | 247.000 | Dec. | 1889 | 5.00 |
| 70 | Ideal, S. L. | Colo. | 1,500,000 | 50,000 | 10 | * | .... | .... | .... | 5,235,900 | Oct. | 1886 | .05 |
| 71 | Illinois, S. | N. M. | 100,000 | 100,000 | 1 | * | .... | .... | .... | 15,000 | Apl | 1889 | .20 |
| 72 | Independence, C. | Nev. | 10,000,000 | 100,000 | 100 | 340,000 | Oct. | 1886 | .20 | 45,000 | Sept | 1879 | .25 |
| 73 | Iron Hill, S. | Dak. | 2,500,000 | 250,000 | 10 | 134,000 | July | 1889 | .08 | 225,000 | Nov | 1887 | .07½ |
| 74 | Iron-Silver, S. L. | Colo. | 10,000,000 | 500,000 | 20 | * | .... | .... | .... | 156,250 | Nov | 1889 | .20 |
| 75 | Jackson, G. | Nev. | 5,000,000 | 50.000 | 100 | 237,500 | Nov | 1880 | .30 | 2,500.000 | Apl. | 1889 | .10 |
| 76 | Jay Gould | Mont | 2,000,000 | 40,000 | 5 | * | .... | .... | .... | 55,000 | Jun | 1889 | .04 |
| 77 | Jocuistita, S. | Mex. | 2,500,000 | 250,000 | 10 | .... | .... | .... | .... | 395,000 | Apl | 1889 | .04 |
| 78 | Jumbo, G. | Colo. | 2,000,000 | 200,000 | 10 | * | .... | .... | .... | 1,200,000 | Feb. | 1885 | .50 |
| 79 | Kearsarge, C. | Mich | 1,250,000 | 50,000 | 25 | 190,000 | Oct. | 1887 | 1.00 | 35,000 | Jan | 1887 | .02½ |
| 80 | Kentuck. | Nev. | 3,000,000 | 30,000 | 100 | 360,000 | Dec. | 1889 | .30 | 100,000 | Jan | 1890 | 2.00 |
| 81 | La Plata, S. L. | Colo. | 2,000,000 | 200,000 | 10 | * | .... | .... | .... | 1,350,000 | Dec. | 1886 | .10 |
| 82 | Leadville Cons., S. L. | Colo. | 4,000,000 | 400,000 | 10 | * | .... | .... | .... | 610,000 | Sept | 1882 | .30 |
| 83 | Lexington, G. S. | Mont | 4,000,000 | 40,000 | 100 | * | .... | .... | .... | 423,000 | Apl. | 1889 | .05 |
| 84 | Little Chief, S. L. | Colo. | 10,000,000 | 200,000 | 50 | * | .... | .... | .... | 606,000 | Jan. | 1885 | 2.00 |
| 85 | Little Pittsburg, S. L. | Colo. | 20,000,000 | 200,000 | 100 | * | .... | .... | .... | 810,000 | Jan. | 1890 | .05 |
| 86 | Martin White, S. | Nev. | 10,000,000 | 100,000 | 100 | 100,000 | Feb. | 1890 | .25 | 1,050,000 | Mch. | 1886 | .25 |
| 87 | Mary Murphy, G. S. | Colo. | 350,000 | 3,500 | 100 | * | .... | .... | .... | 140.000 | Dec. | 1888 | 5.00 |
| 88 | Matchless, S. | Colo. | 500.000 | 500,000 | 1 | * | .... | .... | .... | 175,000 | May | 1890 | .00½ |
| 89 | Minnesota, C. | Mich | 1,000,000 | 40,000 | 25 | 420,000 | Apl. | 1886 | 1 00 | 15,000 | Feb. | 1876 | .... |
| 90 | Mono, G. | Cal. | 5,000,000 | 50,000 | 100 | 102,850 | Nov. | 1889 | .25 | 1,820,000 | Mar. | 1886 | .25 |
| 91 | Montana, Lt., G. S. | Mont | 3,300,000 | 660,000 | 5 | * | .... | .... | .... | 12,500 | Jan | 1890 | .09 |
| 92 | Morning Star, S. L. | Colo. | 1,000,000 | 100,000 | 10 | * | .... | .... | .... | 2,415,951 | Dec. | 1889 | .20 |
| 93 | Moulton, S. G. | Mont | 2,000,000 | 400,000 | 5 | * | .... | .... | .... | 800,000 | Dec. | 1887 | .07½ |
| 94 | Mount Pleasant, G. | Cal. | 150,000 | 150,000 | 1 | * | .... | .... | .... | 380,000 | Dec. | 1887 | .30 |
| 95 | Mt. Diablo, S. | Nev. | 5,000,000 | 50,000 | 100 | 137,500 | Jun. | 1880 | 2.00 | 150,000 | Feb. | 1889 | .20 |
| 96 | Napa, Q. | Cal. | 700,000 | 100,000 | 7 | * | .... | .... | .... | 161,000 | Oct | 1890 | .10 |
| 97 | Navajo, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 485,000 | Apl. | 1888 | .30 | 36 1,000 | Feb | 1889 | .10 |
| 98 | New Guston, G. | Mont | 500,000 | 100,000 | 5 | * | .... | .... | .... | 365,000 | Api | 1889 | .87½ |
| 99 | N. Hoover Hill, G. S. | N. C. | 300,000 | 120,000 | 2½ | * | .... | .... | .... | 287,500 | Dec | 1885 | .00½ |
| 100 | Northern Belle, S. | Nev. | 5,000,000 | 50,000 | 100 | 425,000 | Jan. | 1884 | 8.50 | 30,000 | Dec. | 1883 | .50 |
| 101 | North Belle Isle, S. | Nev. | 10,000,000 | 100,000 | 100 | 400,000 | Sept | 1889 | .20 | 2,400,000 | Apl. | 1888 | .50 |
| 102 | North Star, G. | Cal. | 1,000,000 | 100,000 | 10 | * | .... | .... | .... | 230.000 | May | 1889 | .50 |
| 103 | Ontario, S. L. | Utah | 15,000,000 | 150,000 | 100 | * | .... | .... | .... | 250.000 | Dec. | 1890 | .50 |
| 104 | Opair, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 4,159,440 | May | 1889 | .50 | 10,775,0 0 | Feb. | 1882 | 1.00 |
| 105 | Original, S. | Mont | 1,500,000 | 60,000 | 25 | * | .... | .... | .... | 1,945,800 | July | 1888 | .05 |
| 106 | Osceola, C. | Mich | 1,250,000 | 50,000 | 25 | 480,000 | Apl. | 1876 | 1.60 | 123,000 | July | 1890 | 1 00 |
| 107 | Oxford, G. | N. S. | 125,000 | 125,000 | 25 | * | .... | .... | .... | 1,272,500 | Mar. | 1888 | .02 |
| 108 | Paradise Valley, G. S. | Nev. | 10,000,000 | 100,000 | 1 | 57,000 | Apl. | 1888 | .15 | 73,500 | Sept | 1887 | .10 |
| 109 | Parrot, C. | Mont | 1,800,000 | 180,000 | 10 | * | .... | .... | .... | 150.000 | Api | 1890 | .10 |
| 110 | Peacock, G. C. | N.M. | 2,000,000 | 200,000 | 10 | * | .... | .... | .... | 516,000 | Jan. | 1886 | .... |
| 111 | Plumas Eureka, G. | Cal. | 1,400,250 | 140,025 | 10 | * | .... | .... | .... | 90,000 | Nov. | 1889 | .37½ |
| 112 | Piutus, G. S. C. L. | Colo. | 2,000,000 | 300,000 | 10 | * | .... | .... | .... | 2,548,046 | Oct | 1886 | .10 |
| 113 | Plymouth Con., G. | Cal. | 5,000,000 | 100,030 | 10 | * | .... | .... | .... | 20,000 | Feb. | 1884 | .40 |
| 114 | Quicksilver, pref., Q. | Cal. | 4,300,000 | 43,000 | 50 | .... | .... | .... | .... | 2.280.000 | Feb. | 1890 | 1.50 |
| 115 | " com., Q. | Cal. | 5,700,000 | 57,000 | 100 | .... | .... | .... | .... | 1,577,053 | Feb | 1882 | .40 |
| 116 | Quincy, C. | Mich | 1,000,000 | 40,000 | 25 | 200,000 | Dec. | 1862 | .... | 643,867 | July | 1889 | 3.00 |
| 117 | Republic, C. | Mich. | 5,000,000 | 100,000 | 50 | 400,0 0 | Dec. | 1889 | .30 | 5,370,000 | Jan | 1887 | 1.25 |
| 118 | Richmond, S. L. | Nev. | 1,350,00. | 54,000 | 25 | * | .... | .... | .... | 4,312,587 | Jun. | 1889 | .50 |
| 119 | Ridge, C. | Mich. | 500,000 | 20,000 | 25 | 219,939 | Mar | 1886 | .50 | 99,785 | Feb. | 1886 | .05 |
| 120 | Robinson Con., S. L. | Colo. | 10,000,000 | 200,000 | 50 | * | .... | .... | .... | 585,000 | Mar. | 1882 | .50 |
| 121 | Robert E. Lee, S. L. | Colo | 10,000,000 | 500,000 | 50 | .... | .... | .... | .... | 100,000 | Dec. | 1869 | 3.00 |
| 122 | Savage, S. | Nev. | 11,200,000 | 112,000 | 100 | 3,642,000 | July | 1889 | .50 | 4,460,000 | July | 1883 | .01 |
| 123 | Shoshone, G. | Idah. | 150,000 | 150,000 | 1 | .... | .... | .... | .... | 7,500 | Apl. | 1887 | .12½ |
| 124 | Sierra Buttes, G. | Cal. | 2,225,000 | 222,500 | 10 | * | .... | .... | .... | 1,565,145 | Apl. | 1871 | 1.00 |
| 125 | Sierra Nevada, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 4,250,000 | Oct. | 1889 | .50 | 102,000 | Jan. | 1889 | .10 |
| 126 | Sierra Nevada, S. L. | Idaho | 1,000,000 | ¶ | 1 | * | .... | .... | .... | 270,000 | Apl. | 1889 | .02 |
| 127 | Silver Cord, G. S. L. | Colo. | 4,500,000 | 450,000 | 10 | * | .... | .... | .... | 40,000 | May | 1887 | .25 |
| 128 | Silver King, S. | Ariz. | 10,000,000 | 100,000 | 100 | 80,000 | Jan. | 1890 | .30 | 270,000 | July | 1889 | .05 |
| 129 | Silver Mg. of L. | N. M. | 500,000 | 500,000 | 1 | * | .... | .... | .... | 50,000 | June | 1890 | .05 |
| 130 | Silverton, G. S. L. | Colo. | 2,000,000 | 200,000 | 10 | * | .... | .... | .... | 73,000 | Feb | 1881 | .25 |
| 131 | Small Hopes Cons., S. | Colo. | 5,000,000 | 250,000 | 20 | * | .... | .... | .... | 50,000 | Jan | 1889 | .10 |
| 132 | Spring Valley, G. | Cal. | 200,000 | 200,000 | 1 | 50,000 | Oct. | 1886 | .25 | 3,137,500 | Jun | 1888 | .05 |
| 133 | Standard, G. S. | Cal. | 10 000,000 | 100,000 | 100 | 25,000 | Oct. | 1884 | .25 | 3,595,000 | Jun. | 1881 | .05 |
| 134 | Stormont, S. | Utah | 500,000 | 500,000 | 100 | * | .... | .... | .... | 155,000 | Nov. | 1887 | .20 |
| 135 | St. Joseph, L. | Mo. | 1,500,000 | 150,000 | 1 | * | .... | .... | .... | 844.00 | Dec. | 1888 | .02½ |
| 136 | Swansea, G. | Colo. | 600,000 | 60,000 | 10 | * | .... | .... | .... | 9,000 | Apl. | 1881 | .20 |
| 137 | Tamarack, C. | Mich. | 1,000,000 | 40,000 | 25 | 520,000 | Apl. | 1885 | 3.00 | 100,000 | Nov | 1882 | .10 |
| 138 | Tip Top, S. | Ariz. | 10,000,000 | 100,000 | 100 | 250,000 | Sept | 1883 | .25 | 1,44 ,000 | Apl. | 1890 | 8 00 |
| 139 | Tombstone, G. & L. | Ariz. | 12,500,000 | 500,000 | 100 | * | .... | .... | .... | 1,350,000 | Apl. | 1884 | .20 |
| 140 | United Verde, C. | Ariz. | 3,000,000 | 300,000 | 25 | .... | .... | .... | .... | 97,500 | Feb. | 1886 | 2.50½ |
| 141 | Valencia, M. | N. H. | 150.000 | 1,500 | 100 | * | .... | .... | .... | 37,500 | Apl | 1888 | .37½ |
| 142 | Viola L., S. L. | Idah. | 750,000 | 150,000 | 5 | * | .... | .... | .... | 272,500 | Oct. | 1887 | .10 |
| 143 | Ward Cons., S. L. | Colo. | 2,000,000 | 200,000 | 10 | * | .... | .... | .... | 1,275,000 | July | 1889 | .05 |
| 144 | Yankee Girl, S. | Colo | 2,500,000 | 250,000 | 10 | * | .... | .... | .... | 21,000 | Dec. | 1871 | 1.50 |
| 145 | Yellow Jacket, G. S. | Nev. | 12,000,000 | 120,000 | 100 | 5,500,000 | Mar | 1889 | .50 | 2,184,000 | Aug. | 1889 | 10 |
| 147 | Webb City, L. Z. | Mo. | 55,000 | 11,000 | 5 | .... | .... | .... | .... | 3,300 | Jun | 1889 | .10 |
| 148 | Woodside | Utah | ..... | ..... | .... | .... | .... | .... | .... | 25.000 | Oct. | 1889 | .25 |
| 149 | Young America | Cal. | ..... | ..... | .... | .... | .... | .... | .... | 175,000 | .... | 1889 | .10 |

## NON-DIVIDEND PAYING MINES

| | Name and Location of Company. | Capital Stock. | Shares. No. | Par Value. | Assessments. Total levied | Date & am of last. |
|---|---|---|---|---|---|---|
| 1 | Azuasis Cons., S. L. | Colo. | $2,500,000 | $50 | * | .... |
| 2 | Alleghany, S. | Colo. | 5,000,000 | 50 ,000 | 10 | .... |
| 3 | Altoues, C. | Mich | 2,000,000 | 80,000 | 25 | $737,000 Jan 1890 .50 |
| 4 | Alpha Con., G. S. | Nev. | 3,000,000 | 30,000 | 100 | 588,750 July 188 $7½ |
| 5 | Alta, S. | Nev. | 10,080,000 | 100,800 | 100 | 2,248,800 Sept 188 .50 |
| 6 | Amador, G. | Cal. | 400,000 | 200,000 | 2 | * .... .... |
| 7 | American Flag, S. | Colo. | 1,250,000 | 125,000 | 10 | 300,000 Ju 187 .50 |
| 8 | Amity, S. | Colo. | 250,000 | 250,000 | 1 | .... .... .... |
| 9 | Angio-Montana, Lt. | Mon. | 600,000 | 120,000 | 5 | .... .... .... |
| 10 | Astoria, G. | Cal. | 200,000 | 100,000 | 2 | .... .... .... |
| 11 | Barcelona, G. | Nev. | 5,000,000 | 200,000 | 25 | * .... .... |
| 12 | Bechtel Con., G. | Cal. | 10,000,000 | 100,000 | 100 | 173,500 Jan 1889 1 |
| 13 | Belmont, S. | Nev. | 5,000,000 | 50,000 | 100 | 735.000 Apl 1886 1 |
| 14 | Best & Belcher, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 2,180,59 Jan. 1890 3 |
| 15 | Big Pittsburg, S. L. | Colo. | 20,000,000 | 200,000 | 100 | * .... .... |
| 16 | Bi-Metallic, S. | Mon. | 5,000,000 | 200,000 | 25 | * .... .... |
| 17 | Black Oak, G. | Cal. | 3,000,000 | 300,000 | 10 | * .... .... |
| 18 | Boston Con., G. | Cal. | 10.000,000 | 100,000 | 100 | 170,000 Nov 1883 .25 |
| 19 | Bremen, S. | N. M. | 5,000,000 | 500,000 | 10 | * .... .... |
| 20 | Brownlow, S. | Colo. | 250,000 | 250,000 | 1 | .... .... .... |
| 21 | Brunswick, G. | Cal. | 2,000,000 | 400,000 | 5 | .... .... .... |
| 22 | Bullion, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 4,007,000 Aug. 1888 .50 |
| 23 | Calaveras, G. | Cal. | 500,000 | 500,000 | 1 | * .... .... |
| 24 | Carisa, G. | Wy. | 500.000 | 100,000 | 5 | * .... .... |
| 25 | Carupano, G. S. L. C. | Ven. | 200,000 | 100,000 | 2 | * .... .... |
| 26 | Cashier, G. S. | Colo. | 500,000 | 250,000 | 2 | * .... .... |
| 27 | Charles Dickens, G. S. | Idah. | 1,250,000 | 250,000 | 5 | * .... .... |
| 28 | Cherokee, G. | Cal. | 1,500,000 | 150,000 | 10 | * .... .... |
| 29 | Chollar, S. | Nev. | 11,200,000 | 112,000 | 100 | 1,484,000 July 1889 .5 |
| 30 | Cleveland, T. | Dak. | 1,000,000 | 500,000 | 2 | * .... .... |
| 31 | Colchis. | N. M. | 500,000 | 50,000 | 10 | .... .... .... |
| 32 | Commonwealth, S. | Nev. | 10,000,000 | 100,000 | 100 | 170,000 Nov 1888 .50 |
| 33 | Comstock, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 30 000 Mar. 1887 15 |
| 34 | Con. Imperial, G. S. | Nev. | 5,000,000 | 50,000 | 100 | 1,902,50 Nov. 1889 .05 |
| 35 | Con. Pacific, G. | Cal. | 6,000 000 | 60,000 | 100 | 192,000 Oct. 1889 .10 |
| 36 | Cons. Silver, S. | Mo. | 2,500,000 | 250,000 | 10 | .... .... .... |
| 37 | Crescent, S. L. | Colo. | 3,000,000 | 300,000 | 10 | * .... .... |
| 38 | Crocker, S. | Ariz. | 10,000,000 | 100,000 | 100 | 135,000 Jan. 1890 .10 |
| 39 | Crowell, G. | N. C. | 500,000 | 500,000 | 1 | .... .... .... |
| 40 | Diablonega, G. | Ga. | 250,000 | 250,000 | 1 | * .... .... |
| 41 | Dandy, S. | Colo. | 5,000,000 | 500,000 | 10 | .... .... .... |
| 42 | Decatur, S. | Colo. | 1,500,000 | 300,000 | 5 | * .... .... |
| 43 | Denver City, S. L. | Colo. | 5,000,000 | 500,000 | 10 | * .... .... |
| 44 | Denver Gold, G. | Colo. | 300,000 | 60,000 | 5 | .... .... .... |
| 45 | Durango, G. | Colo. | 500,000 | 500,000 | 1 | * .... .... |
| 46 | Eastern Nev. Co., Lt. | N. S. | 1,500,000 | 150,000 | 10 | 990,000 Mar. 1886 1.7 |
| 47 | El Cristo, G. S. | U.S.C | 1,000,000 | 200,000 | 2 | * .... .... |
| 48 | El Dorado, G. | Cal. | 1,000,000 | 250,000 | 4 | * .... .... |
| 49 | El Talento, G. | U.S.C | 1,000,000 | 500,000 | 2 | * .... .... |
| 50 | Empire, S. | Utah | 10,000,000 | 100,000 | 100 | * .... .... |
| 51 | Eureka Tunnel, S. L. | Nev. | 10,000,000 | 100,000 | 100 | * .... .... |
| 52 | Exchequer. | Nev. | 10,000,000 | 100,000 | 100 | 515,000 Apl, 1886 1.25 |
| 53 | Found Treasure, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 30,53 Apl 1889 2½ |
| 54 | Gogebic L Syn., I. | Wis. | 5,600,000 | 200,000 | 25 | * .... .... |
| 55 | Gold Cup, S. | Colo. | 500,000 | 500,000 | 1 | * .... .... |
| 56 | Golden Era, S. | Mon. | 2 000,000 | 200,000 | 10 | * .... .... |
| 57 | Gold Placer, G. | Colo. | 5,000,000 | 200,000 | 25 | 229,314 Dec. 1885 .25 |
| 58 | Gold Rock, G. | Cal. | 1,000,000 | 500,000 | 2 | * .... .... |
| 59 | Goodshaw, G. | Cal. | 10,000,000 | 100,000 | 100 | * .... .... |
| 60 | Grand Belt, C. | Cal. | 12,000,000 | 120,000 | 100 | .... .... .... |
| 61 | Grand Duke. | Colo. | 800,000 | 80,000 | 10 | .... .... .... |
| 62 | Great Romance, G. | U.S.C | 1,000,000 | 500,000 | 2 | * .... .... |
| 63 | Gregory-Bobtail, G. | Colo. | 550,000 | 550,000 | 1 | * .... .... |
| 64 | Gregory Con., G. | Mon. | 3,000,000 | 300,000 | 10 | .... .... .... |
| 65 | Harlem G. & M. Co. | Cal. | 1,000,000 | 200,000 | 5 | .... .... .... |
| 66 | Hecla Cons. & Tr. | Ariz. | 10,000,000 | 100,000 | 100 | .... .... .... |
| 67 | Hector, G. | Cal. | 1,500,000 | 300,000 | 5 | 45,000 Jan. 1889 .15 |
| 68 | Highland, C. | Mich | 500,000 | 25,000 | 20 | .... .... .... |
| 69 | Hollywood. | Cal. | 200,000 | 100,000 | 2 | .... .... .... |
| 70 | Hortense, S. | Colo. | 2,000,000 | 200,000 | 10 | .... .... .... |
| 71 | Huron, C. | Mich | 1,000,000 | 40,000 | 25 | 980,000 May 1887 3 00 |
| 72 | Iron Gold & Silver, S. | N. M. | 2,000,000 | 200,000 | 10 | * .... .... |
| 73 | Ironton, L. | Wis. | 1,000,000 | 40,000 | 25 | .... .... .... |
| 74 | Iroquois, C. | Mich | 1,250,000 | 50,000 | 25 | * .... .... |
| 75 | J. D. Reymert. | Ariz. | 10,000,000 | 100,000 | 100 | * .... .... |
| 76 | Julia Cons., G. S. | Nev. | 11,000,000 | 110,000 | 100 | 1,660,000 Jan. 1889 .10 |
| 77 | Lacrosse, G. | Colo. | 1,000,000 | 100,000 | 10 | * .... .... |
| 78 | Lee Basin, S. L. | Colo. | 5,000,000 | 500,000 | 10 | .... .... .... |
| 79 | Mayflower Gravel. | Cal. | 1,000,000 | 100,000 | 10 | 635,000 Jan 1890 .... |
| 80 | May Maxeppa, S. | Colo | 500,000 | 500,000 | 1 | * .... .... |
| 81 | Medora, G. | Dak. | 250,000 | 250,000 | 1 | .... .... .... |
| 82 | Mexican, S. | Nev. | 10,000,000 | 100,000 | 100 | 2,800,760 Dec. 1889 .25 |
| 83 | Middle Bar G. | Cal. | 400,000 | 200,000 | 2 | * .... .... |
| 84 | Mike & Starr, S. L. | Colo. | 1,000,000 | 200,000 | 5 | * .... .... |
| 85 | Mollie Gibson. | Colo. | 2,000,000 | 200,000 | 10 | * .... .... |
| 86 | Monitor, G. | Colo. | 100,000 | 100,000 | 1 | * .... .... |
| 87 | Mutual Mg. & Sm. | W'sh | 100,000 | 100,000 | 1 | * .... .... |
| 88 | Native, C. | Mich | 1,000,000 | 40,000 | 25 | .... .... .... |
| 89 | Neath, G. | Colo. | 1,000,000 | 100,000 | 10 | .... .... .... |
| 90 | Nevada Queen, S. | Nev | 10,000,000 | 100,000 | 100 | 250,000 Oct. 1889 .... |
| 91 | New Germany, G. | Nova S. | 100,000 | 100,000 | 1 | * .... .... |
| 92 | New Pittsburg, S. L. | Cole | 2,000,000 | 200,000 | 10 | * .... .... |
| 93 | N. Commonw'h, S. | Nev. | 10,000,000 | 100,000 | 100 | 60,000 Apl 1889 .... |
| 94 | North Standard, G. | Cal. | 10,000,000 | 100,000 | 100 | 20,000 Nov .... 10 |
| 95 | Noonday. | Cal. | 600,000 | 60,000 | 10 | 208,000 Dec 1881 .... |
| 96 | Oneida Chief, G. | Cal. | 500,000 | 125,000 | 100 | * .... .... |
| 97 | Oriental & Miller, S. | Nev. | 10,000,000 | 400,000 | 25 | .... .... .... |
| 98 | Osceola, S. | Nev. | 5,000,000 | 500,000 | 10 | .... .... .... |
| 99 | Overman, S. | Nev. | 11,520,000 | 115,200 | 100 | 3,823,460 Dec. 1889 25 |
| 100 | Park, S. | Utah | 2,000,000 | 200,000 | 10 | .... .... .... |
| 101 | Peer, S. | Ariz. | 10,000,000 | 100,000 | 100 | 155,000 Sept 1889 .... |
| 102 | Peerless, S. | Ariz. | 10,000,000 | 100,000 | 100 | 370,000 Mar 1889 .25 |
| 103 | Phenix. | Ariz. | 500,000 | 500,000 | 1

# NEW YORK MINING STOCKS QUOTATIONS.

## DIVIDEND-PAYING MINES

| NAME AND LOCATION OF COMPANY. | March 1. | | March 3. | | March 4 | | March 5. | | March 6. | | March 7 | | SALES. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | |
| Adams, Colo | .75 | | .80 | | | | | | .80 | | | | 800 |
| Alice, Mont | | | | | 1.30 | 1.20 | 1.25 | | 1.35 | | | | 2,150 |
| Argenta, Nev | | | | | | | .13 | | | | | | 500 |
| Asp n Mg , Colo | | | 9.00 | 8 25 | 9 00 | | | | | | | | 600 |
| Belcher | | | | | | | | | | | | | |
| Belle Isle, Nev | | | .30 | .25 | | | | | | | | | 200 |
| Bodie Cons., Cal | | | | | | | | | | | | | |
| Bos. & Mont., Mont | | | | | | | | | | | | | |
| Breece, Colo | .45 | | | | | | .45 | | .45 | .40 | | | 700 |
| Bulwer, Cal | | | | | | | | | | | | | |
| Caledonia, Dak | | | .30 | | | | .35 | | | | | | 200 |
| Calumet & Hecla | | | | | | | | | | | | | |
| Colorado Central | | | | | | | | | | | | | |
| Cons. Cal. & Va., Nev. | 4.80 | | | | 4.85 | 4.75 | 4.75 | | | | | | 310 |
| Crown Point, Nev | 2.00 | | | | | | 1.95 | | | | 1.70 | | 300 |
| Deadwood, Dak | | | 1.50 | | | | 1.50 | | | | | | 200 |
| Dunkin, Colo | | | | | | | | | | | | | |
| Eureka Con | | | | | 3.75 | | | | | | | | 100 |
| Father de Smet, Dak | | | | | | | | | | | | | |
| Franklin, Mich | | | | | | | | | | | | | |
| Freeland, Colo | .75 | .60 | 1 30 | .65 | 1 20 | 1 10 | 1 25 | 1.05 | 1.25 | 1 20 | 1.20 | 1.10 | 52,930 |
| Gould & Curry, Nev | | | 1.55 | | 1 55 | | 1.50 | | | | 1.45 | | 400 |
| Hale & Norcross, Nev | | | | | 2.85 | | | | | | | | 100 |
| Holyoke, Id | | | | | | | | | | | | | |
| Homestake, Dak | | | | | | | | | | | | | |
| Horn-Silver, Ut | 2.25 | | 2.40 | 2 20 | 2.40 | | 2.40 | 2.35 | 2.40 | | 2.45 | 2.40 | 2,015 |
| Iron Silver | | | | | | | | | 2.15 | | | | 100 |
| Kentuck, Nev | | | | | | | | | | | | | |
| Leadville Co., Colo | .10 | | .10 | | | | .12 | .10 | | | | | 4,700 |
| Little Chief, Colo | | | .25 | | | | .30 | .29 | .30 | | .31 | .30 | 4,700 |
| Little Pittsburg, Colo | | | | | | | | | | | | | |
| Moulton, Mont | | | .31 | | | | | | | | | | 2,000 |
| Mt. Diablo, Nev | | | | | | | | | | | | | |
| Navajo, Nev | | | | | | | .30 | | | | | | 200 |
| North Belle Isle, Nev | | | | | | | | | | | | | |
| North Star, Cal | | | | | | | | | | | | | |
| Ontario, Ut | | | 40.25 | | | | | | | | 40.00 | | 110 |
| Opnir, Nev | | | | | 4.30 | | | | | | | | 110 |
| Osceola, Mich | | | | | | | | | | | | | |
| Plutus, Colo | | | | | | | | | | | | | |
| Plymouth, Cal | | | | | | | | | | | | | |
| Quicksilver, Pref | | | | | | | | | | | | | |
| Com | | | | | | | | | | | | | |
| Robinson Cons. Colo | | | | | | | | | | | | | |
| Savage, Nev | | | 1.75 | | | | | | | | | | 100 |
| Sierra Nevada, Nev | | | | | | | | | | | | | |
| Silver Cord | .45 | | | | | | | | .47 | | | | 1,000 |
| Silver King | | | | | .50 | .42 | .49 | .42 | .43 | | .46 | .40 | 1,825 |
| Silver Mg. of L. V | .38 | | .36 | | | | | | | | | | 1,500 |
| Small Hopes, Colo | 1.10 | | | | | | | | | | | | 200 |
| Standard, Cal | | | | | | | | | | | | | |
| Tamarack | | | | | | | | | | | | | |
| Yellow Jacket | 2.25 | | | | 2.40 | | 2 25 | | | | | | 300 |

## NON-DIVIDEND-PAYING MINES.

| NAME AND LOCATION OF COMPANY. | March 1. | | March 3. | | March 4 | | March 5 | | March 6. | | March 7. | | SALES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | |
| Allouez, Mich | | | | | | | | | | | | | |
| Alta, Nev | 1.40 | | | | | | | 1.35 | | | | | 200 |
| Andes, Nev | | | | | | | | | | | | | |
| Amador, Cal | | | | | | | | | | | | | |
| American Flag, Colo | | | | | | | | | | | | | |
| Astoria, Cal | | .08 | .07 | .07 | | | .07 | | .07 | .05 | .06 | .06 | 34,0 0 |
| Barcelona, Nev | | | | | | | .25 | .25 | .23 | .25 | | | 1,2.0 |
| Bechtel, Cal | | | | | | | | | | | | | |
| Best & Belcher, Nev | 1.95 | | | | | | | | | | | | 100 |
| Brunswick, Cal | | | | | | | | | | | | | |
| Bullion, Nev | .65 | | | | | | 1.70 | | 70 | | | | 5 00 |
| Butte & Bost., Mont | | | | | | | | | | | | | |
| Castle Creek, Id | | | | | | | | | | | | | |
| Chollar, Nev | | | 2 60 | | | | | | | | | | 100 |
| Col. & Beaver, Id | | | | | | | | | | | | | |
| Commonw'th, Nev | 4.00 | | | | | | | | | | | | 100 |
| Comstock T., Nev | | | | | | | | | | | | | |
| " bonds | | | | | | | | | | | | | |
| " scrip | 33.00 | | | | | | | | | | | | 100 |
| Con. Imperial, Nev | | | 50 | | | | | | | | | | 100 |
| Del Monte, Nev | | | 1.00 | | | | | | | | | | 200 |
| El Cristo, Rep of Col | 1.40 | | 1.35 | | | | 1.30 | | 1.85 | 1.30 | 1.35 | | 1,200 |
| Excelsior, Cal | | | | | | | | | | | | .78 | 200 |
| Exchequer Nev | .70 | | | | | | .70 | | | | | | 300 |
| Julia, Nev | .35 | | | | | | .35 | | .30 | | | | 500 |
| Kingst'n & Pemb'ke | | | | | | | | | | | | | |
| Kossuth, Nev | | | | | | | | | | | | | |
| Lacrosse, Colo | .07 | | | | | | | | .07 | | .11 | .07 | 5,600 |
| Lee Basin, Colo | | | | | | | | | | | | | |
| Mexican, Nev | 3.55 | | 3.55 | | 3 50 | | 3.60 | | | | | | 400 |
| Middle Bar, Cal | | | | | | | | | | | | | |
| Moulten, Mont | | | | | | | | | | | | | |
| Mutual Sm. & M. Co | | | 1.65 | | 1.60 | | | | | | | 1.60 | 1,2 0 |
| Nevada Queen, Nev | | | .95 | | | | | | | | | | 1.0 |
| N. Com'nw'th, Nev | | | 1.03 | | | | | | | | | | 2 0 |
| Occidental, Nev | 1.00 | | | | | | | | | | | | 3 0 |
| Oriental & Mill., Nev | | | .07 | | | | | | | | | | 500 |
| Overman, Nev | | | | | | | | | | | | | |
| Phœnix of Ariz | .82 | .80 | 83 | .80 | .80 | .78 | .82 | .76 | .81 | .80 | | | 5,000 |
| Potosi, Nev | 1.75 | | | | | | | | | | | 1.70 | 2 0 |
| Rappahann'k, Va | .06 | | | | | | | | | | | .05 | 1,500 |
| S. Sebastian, San S | | | | | | | | | | | | | |
| Scorpion, Nev | | | | | | | | | | | | | |
| Shoshone Idaho | | | | | | | | | | | | | |
| Silver Hill, Nev | | | | | | | | | | | | | |
| Silver Queen | | | | | | | | | | | | | |
| Stanislaus, Cal | | | | | | | | | | | | | |
| Sutro Tunnel, Nev | | | | | | | | .05 | | | | | 500 |
| " Trust Cert. | | | | | | | | | | | | | |
| Sutter Creek, Cal | 1.50 | 1 45 | 1.60 | 1.50 | 1.60 | | 1.60 | | 1.60 | | 1.60 | 1 40 | 8,900 |
| Tornado, Nev | | | | | | | | | | | | | |
| Union Cons., Nev | | | | | | | | | | | | | |
| Utah, Nev | .80 | | .70 | | .45 | | .75 | | .70 | | .65 | | 1,300 |

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities ‡Assessment unpaid. Dividend shares sold, 78,340. Non-dividend shares sold, 64,900 Total, New York, 143,240.

# BOSTON MINING STOCK QUOTATIONS.

| NAME OF COMPANY. | Feb. 28. | | Mch. 1. | | Mch. 3. | | Mch. 4. | | Mch. 5. | | Mch. 6. | | SALES. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Atlantic, Mich | 13.50 | | | | | | | | | | | | 100 |
| Bodie, Cal | | | | | | | | | | | | | |
| Bonanza Developm't | | | | | .80 | | .80 | | .80 | | | | 300 |
| Bost. & Mont., Mont | 45.75 | 45.50 | 45 50 | 45.00 | 45.50 | 45.00 | 45.25 | 45.00 | 45.50 | 45 38 | 45.75 | 45 38 | 1,0 6 |
| Breece, Colo | .47 | | | | | | .45 | | .45 | | | | 600 |
| Calumet & Hecla, Mich | 254 | | 253 | | 255 | | | | 255 | | | | 76 |
| Catalpa, Colo | | | | | .19 | | .19 | | .19 | | | | 1,400 |
| Central, Mich | 13.00 | | | | | | | | | | | | 100 |
| Chrysolite, Colo | | | | | | | | | | | | | |
| Con. Cal. & Va., Nev | | | | | | | | | | | | | |
| Dunkin, Colo | .68 | | | | 65 | | 65 | .60 | .65 | | .60 | | 900 |
| Enterprise | | | | | | | | | | | | | |
| Franklin, Mich | | | | | 13.50 | | 13.50 | | 13.25 | | | | 150 |
| Hale & Norcross, Nev | | | | | | | | | | | | | |
| Honorine, Utah | | | | | | | | | | | | | |
| Little Chief | .30 | | | | | | | | .27 | | | | 500 |
| Little Pittsburg, Colo | | | | | | | | | | | | | |
| Martin White, Nev | | | | | | | | | | | | | |
| Moulton | | | | | | | | | | | | | |
| Napa, Cal | | | 5.00 | | | | 5.00 | | | | | | 350 |
| Ontario, Utah | | | | | | | | | | | | | |
| Osceola, Mich | 26.25 | 26.00 | | | 26.50 | 26.25 | 26 00 | | | | 26.50 | 26.25 | 585 |
| Pewabic, Mich | | | | | | | | | 8.25 | | | | 50 |
| Quincy, Mich | 70.00 | | | | | | 70.00 | | | | | | 75 |
| Ridge, Mich | | | | | | | | | | | 1.13 | | 300 |
| Sierra Nev., Nev | | | | | | | | | | | | | |
| Silver King, Ariz | | | | | | | | | | | | | |
| Standard, Cal | | | | | | | | | | | | | |
| Tamarack, Mich | | | 158 | | 156 | | 160 | 159 | 160 | | | | 74 |

| NAME OF COMPANY. | Feb. 28. | | Mch. 1. | | Mch. 3. | | Mch. 4 | | Mch. 5. | | Mch. 6. | | SALES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allouez, Mich | 2 50 | | 2.50 | | 2.50 | | 2 63 | 2 38 | 2.63 | 2 44 | | | 1,755 |
| Arnold, Mich | .20 | | | | | | | | | | | | 100 |
| Aztec, Mich | | | | | | | | | | | | | |
| Bowman | | | | | | | | | | | | | |
| Butte & Bost., Mont | 14.75 | 14.00 | 15.50 | 14.88 | 15 00 | 14 50 | 15.00 | 13.63 | 13.50 | | 13.88 | | 3,051 |
| Centennial, Mich | | | | | 24.00 | | 25 00 | | | | | | 100 |
| Coms. Tunnel Scrip | | | | | | | | | | | | | |
| Crescent, Colo | .08 | | | | .09 | | .09 | | .09 | | | | 1,3 0 |
| Dana | | | | | | | | | | | | | |
| Don Enrique, N. M. | 36 | | | | .38 | | .38 | | .37 | | | | 850 |
| El Cristy, S. A | | | | | | | | | | | | | |
| Hanover, Mich | | | | | | | | | | | | | |
| Humboldt, Mich | .12 | | | | | | .12 | | | | | | 450 |
| Hungarian | | | | | | | | | | | | | |
| Huron, Mich | 3.00 | | | | 3.63 | | | | | | 3.50 | | 55 |
| Kearsarge | 10.00 | 9.25 | | | 9.50 | | | | 9.13 | 9.00 | 8.75 | | 438 |
| Mesnard, Mich | | | | | | | 35 | | | | | | 100 |
| National, Mich | 2.00 | | | | | | | | | | | | 50 |
| Orien & Miller, Nev | | | | | | | | | 07 | | | | 300 |
| Phœnix, Ariz | | | | | | | | | | | | | |
| Pontiac, Mich | | | | | | | | | | | | | |
| Rappahannock, Va | | | | | | | | | | | | | |
| Rockland | | | | | | | | | | | | | |
| Santa Fe, N. Mex | 1.05 | 1.00 | 1 03 | | 1.05 | 1.00 | 1.00 | .98 | 1.00 | .98 | 1.00 | .98 | 7,475 |
| Security, Colo | | | | | | | | | | | | | |
| Shoshone, Idaho | | | | | | | | | | | | | |
| South Side, Mich | .20 | | | | .18 | | | | .15 | | | | 300 |
| Star | | | | | | | | | | | | | |
| Washington, Mich | | | | | .15 | | | | | | | | 100 |

Boston: Dividend shares sold, 6,626. Non-dividend shares sold, 16,454. Total Boston, 23,080.

# COAL STOCKS.

| NAME OF COMPANY. | Par val. of sh'rs. | March 1. | | March 3. | | March 4. | | March 5. | | March 6. | | March 7. | | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | |
| American Coal | | | | | | | | | | | | | | |
| Cambria Iron | | | | | | | | | | | | | | |
| Cameron Coal & Iron Co | | | | | | | | | | 3½ | | | | 100 |
| Ches. & O. RR | 100 | | | | | | | | | | | | | |
| Chic. & Ind. Coal RR | 100 | | | | | | | | | | | | | |
| Do. pref | 100 | | | | | | | | | | | | | |
| Col. & Hocking Coal | 100 | | | 15½ | | 17 | | 18 | 17¼ | | | 19 | 18 | 1,810 |
| Col., C. & I | 100 | 43⅝ | 41¼ | 44¼ | 43⅝ | 45 | 43½ | 44⅛ | 44⅛ | 44¼ | 43⅞ | 45⅝ | 44¾ | 11,800 |
| Consolidation Coal | 100 | | | | | | | | | | | | | |
| Del. & H. C | 100 | | | 149¼ | | | | 149½ | 149 | 150⅛ | 149¾ | 150 | 149⅛ | 2,773 |
| D., L. & W. RR | 50 | 135¼ | 134½ | 135¾ | 135 | 135⅝ | 135 | 135½ | 134¼ | 135¾ | 134¾ | 136⅜ | 135⅝ | 69,090 |
| Hocking Valley | 100 | 20 | | 20 | | 20¾ | 20 | | | 20⅛ | 20 | 20⅛ | | 900 |
| Hunt. & Broad Top | | | | | | | | | | 17¼ | | | | 20 |
| Do. pref | | | | 44 | | 44 | | 44 | | 44 | | | | 82 |
| Illinois Coal & Coke Co | | 30⅜ | 30¼ | 30¾ | 30⅛ | 30¾ | 30⅜ | 30¾ | 30 | | | 30¾ | 30¼ | 6,015 |
| Lehigh C. & N | 50 | 52 | | 52⅛ | 52 | 52⅛ | 52 | 52 | 51¾ | 52 | | | | 2,092 |
| Lehigh Valley RR | 50 | 52½ | | 52⅛ | 52⅜ | 52⅝ | 52⅛ | 52⅛ | 52 | 52⅛ | 52 | | | 1,700 |
| Marshall Con. Coal | 100 | | | | | | | | | | | | | |
| Mahoning Coal | 100 | | | | | | | | | | | | | |
| Do. pref | | | | | | | | | | | | | | |
| Maryland Coal | 100 | 15 | | | | | | | | | | | | 100 |
| Morris & Essex | 100 | | | | | | | | | | | 149⅝ | | 200 |
| New Central Coal | 50 | | | | | | | | | | | | | |
| N. J. C. R. R | 100 | 120½ | 120 | 120¾ | | 120¼ | 119¼ | 120 | 119¼ | 119½ | 118¾ | 119 | 120 | 4,543 |
| N. Y. & S. Coal | 100 | | | | | | | | | | | | | |
| N. Y., Susq. & Western | 100 | 7¼ | 7 | 7⅛ | 7 | | | | | | | | | 580 |
| Do. pref | 100 | 27 | | | | | | 28 | | | | | | 74 |
| N. Y. & Perry C. & I | 100 | | | | | | | | | | | | | |
| Norfolk & Western R.R. | 50 | 20 | | | | | | 20½ | 20 | | | 19¾ | | 500 |
| Do. pref | 50 | | | 61¼ | | 60½ | | 60⅝ | 59⅞ | | | 60½ | | 1,260 |
| Penn. Coal | 50 | | | | | | | | | | | | | |
| Penn. RR | 50 | 54¾ | 54⅝ | 54⅝ | 54½ | 54⅛ | 54⅜ | 54⅛ | 54⅜ | | | | | 2,344 |
| *Ph. & R. RR | | 39¼ | 38⅝ | 39⅝ | 39 | 39¼ | 38⅞ | 39¼ | 39⅛ | 37¼ | 35⅝ | 37¾ | 36¼ | 469,322 |
| Sunday Creek Coal | | | | | | | | | | | | | | |
| Do. pref | 100 | | | | | | | | | | | | | |
| Tennessee C. & I. Co | | 60⅞ | 56 | 62¾ | 60 | 62 | 60¼ | 61 | 58 | 59 | 55½ | 59 | 57½ | 11,150 |
| Do. pref | | 104 | | 106 | 104 | | | | | 105 | 102 | | | 410 |
| Westmoreland Coal | | | | | | | | | | | | | | |

**Sales in New York, 389,450; in Philadelphia, 79,872. Total sales 586,865.

## San Francisco Mining Stock Quotations.

| COMPANY | CLOSING QUOTATIONS. | | | | | |
|---|---|---|---|---|---|---|
| | Feb. 28. | March 1. | March 3. | March 4. | March 5. | March 6. |
| Alpha | | | | | | |
| Alta | | | | 1.20 | 1.40 | 1.20 |
| Belcher | | | | | | |
| Belle Isle | | | .30 | | | |
| Best & Bel. | 2.80 | | 2.80 | 2.45 | 2.70 | 2.16 |
| Bodie | | | .50 | .60 | .50 | |
| Bulwer | | | | .20 | | |
| Chollar | 2.45 | 2.40 | 2.45 | 2.40 | 2.15 | 2.20 |
| C'm'weal'h | 4.05 | 3.95 | 3 85 | 3.75 | 3.50 | 3 40 |
| Con. C. & V | | | 4.60 | 4.50 | 4.40 | 4.40 |
| Con. Pac. | | | | | | |
| Crown Pt. | 1.80 | | 1.80 | | 1.65 | 1.60 |
| Eureka C. | 4.00 | | | | | 3.80 |
| Gould & C. | | | | | 1.35 | 1.35 |
| Grd. Prize | | | | | | |
| Hale & N. | 2.65 | | 2.80 | 2.60 | 2 45 | 2.40 |
| M. White | | | | | | |
| Mexican | 3.40 | | 3.50 | 3.40 | 3.25 | 3 15 |
| Mono | .35 | | .35 | .35 | | |
| Mt. Diablo | | | | | | |
| Navajo | | | | | .30 | |
| Nev. Queen | .95 | | 1.00 | 90 | .90 | .80 |
| N. Belle I | 1.20 | 1.30 | 1.45 | 1.40 | 1.30 | 1.20 |
| Occidental | | | | | | |
| Ophir | 4.25 | 4.10 | 4.25 | 4.15 | 4.00 | 3.75 |
| Potosi | 1 60 | 1.60 | 1.70 | 1.75 | 1.55 | 1.55 |
| Savage | 1.65 | 1.60 | | | 1.55 | |
| Sierra Nev | 2.30 | 2.20 | 2.30 | 2.25 | 2.20 | 2.10 |
| Union Con. | 2.00 | 2.40 | 2.55 | 2.45 | 2.22 | 2.20 |
| Utah | | .60 | .65 | .65 | | .55 |
| Yellow Jkt. | 2.15 | | | | 1 95 | |

## STOCK MARKET QUOTATIONS.

### Baltimore, Md.

| COMPANY. | Bid. L. H. | Asked. L. H. |
|---|---|---|
| Atlantic Coal | .... | 1.50 |
| Balt. & N. C. | .09 | .11@.12 |
| Big Vein Coal | .... | .... |
| Conrad Hill | .... | .10 |
| Cons. Coal | .... | .26 |
| Diamond Tunnel | 23½ | .40 |
| George's Crk. C | .... | .... |
| Lake Chrome | .15 | .... |
| Maryland & Charlotte | .... | .06 |
| North State (Balt.) | .... | .... |
| Ore Knob | 10@.13 | .12 |
| Silver Valley | .55@.60 | 65@.80 |

Prices bid and asked, lowest and highest, during the week ending March 5th.

### Birmingham, Ala.

| COMPANY. | Bid. L. H. | Asked. L. H. |
|---|---|---|
| Ala. R. Mill Co. | $100 | $60 |
| *Alice Furnace. | $104½ | .... |
| Anna Howe G. Mg. Co. | $¾ | .... |
| Bessmer Land. | $33¼@$34 | $34¾@$35 |
| Bir. Mg.& M'g. | $80 | .... |
| Cahaba Coal Mg. Co. | $60 | $65 |
| Camille Gold Mg. Co. | $⅛ | $1⅛ |
| De Bardeleben C. & I. Co. | $65 | $80 |
| Decat. L. Imp. | $10¾ | $11½ |
| DecaturMin.L. | $21 | $23 |
| Ensley Land | $14 | .... |
| *Eureka | $102 | $103½ |
| Florence L. & Mg. Co. | $20 | .... |
| Gadsen Land. | $5¾@$5⅞ | $6 |
| Hecia Coal Co. | $30 | .... |
| Hen. S. & M.Co | $101 | .... |
| Mag-Ellen | $100 | .... |
| Mary Lee C. & R. Co. | $30 | .... |
| Sheffield C. & I. Co. | $67½ | .... |
| Sloss I. & S. | .... | $61 |
| †Sloss I. & S. | .... | $95¼ |
| ††Sloss I. & S. | $78¾ | .... |
| Tuscaloose C. I. & L. Co. | $21 | .... |
| Tenn.C. & I. Co. | $61 | $65 |
| " pref. | $101 | $105 |
| Woodstock I.Co. | $56⅜ | $56⅞ |

Prices, highest and lowest, bid and asked during week ending March 3d.

* Bonds. † First mortgage. †† Second mortgage.

### Kansas City, Mo. March 3.

| COMPANY. | Par value. | Bid. | Asked. |
|---|---|---|---|
| Ben Harrison | | $25.00 | $35.00 |
| Burch, L. & Z., Mo. | 1 | .20 | .30 |
| Express Group | | .75 | 1 00 |
| Hillsboro Gold | | .... | .... |
| Farmers' Coal Co | | 50.00 | 75.00 |
| Ida Hill, S., N. Mex | 100 | .... | 100 |
| Kansas City L. & Z. | | .60 | .... |
| Kan. City M. & M. Co. | | 2.60 | 3.00 |
| K. C., Colo. | | .... | .... |
| Kentuck, Z., Mo. | 1 | .... | .... |
| La Motte, Mo. | 100 | .... | 100.00 |
| Leona | | .... | 125 |
| Maverick, S., Colo. | 10 | .... | 1.00 |
| Minnequa Zinc | | .25 | .45 |
| Quartz Mt. | | .67 | .... |
| Ruby Silver | | 1.12 | 1.25 |
| Sonora, G. & S., Mex. | 10 | .... | 1.00 |
| Standard, S. S., Colo. | | .... | .... |
| Silver Monument | | .... | 3.00 |
| Templar, N. Mex. | 1 | .... | 1.00 |
| The Sylph | | .... | 2.50 |
| Webb City, L. Z., Mo. | 5 | 5.65 | .... |
| Wichita, L. Z., Kan. | 100 | .... | .40 |

### Pittsburg, Pa.

| COMPANY. | H. | L. | Closing |
|---|---|---|---|
| Allegheny Gas Co. | $41.00 | $.... | $41.00 |
| Bridgewater Gas Co. | 30.00 | .... | 30.00 |
| Chartiers Val. Gas | 45.00 | .... | 42.00 |
| Columbia Oil Co. | .... | .... | .... |
| Consolidated Gas Co. | 39.00 | .... | 39.00 |
| East End Gas Co | 60.00 | .... | 60.00 |
| Forest Oil | .... | .... | .... |
| Hazlewood Oil Co. | 51.00 | 50.00 | 51.00 |
| La Noria Mining | .25 | .... | .25 |
| Luster Mg. Co. | 19.63 | 12.00 | 19.00 |
| Manuf'turers Gas Co. | 20.00 | .... | 20.00 |
| Nat. Gas Co. of W.Va | 70.00 | .... | 70.00 |
| N.Y.& Clev.Gas Coal | 31.00 | .... | 31.00 |
| Ohio Valley Gas. | .... | .... | .... |
| Mansfield C. & C. Co. | 20.00 | .... | 20.00 |
| Pennsylvania Gas | 14.50 | 13.00 | 13.50 |
| People's N. G. & P. Co. | 16.00 | 15.00 | 16.00 |
| Philadelphia Co. | *32.25 | *30.25 | 32.00 |
| Pine Run Gas Co. | 77.00 | .... | .... |
| Pittsburg Gas | 67.00 | .... | 67.00 |
| Silverton Mg. Co. | 1.25 | .... | 1.25 |
| South Side Gas. | .... | .... | .... |
| Tuna Oil Co. | 68.00 | .... | 68.00 |
| Union Gas | .... | .... | .... |
| Washington Oil Co. | .... | .... | .... |
| W'house Brake Co. | 60.00 | 55.00 | 60.25 |
| W'house A. B. Co. | 110.00 | 108.00 | 109.00 |
| W'house E.Light. | 46.00 | 44.00 | 45.50 |
| W'moreland & Camb. | 20.00 | .... | 20.00 |
| Wheeling Gas | 21.00 | 18.00 | 20.00 |
| Yankee Girl Mg. | 3.00 | .... | 3.00 |

* Actual selling price.

Prices highest, lowest and closing during the week ending March 6th.

Sales during the week ending March 6, 1890:

Philadelphia Co. 350 shares. $32¼@$30¼

Sales at the New York Stock Exchange week ending March 7:

| | Sales. | Price H. | Price L. |
|---|---|---|---|
| *American Cotton Oil | 13,695 | 27⅝ | 26¼ |
| National Lead | 19,760 | 18⅜ | 17 |
| Sugar | 186,058 | 69¾ | 60⅝ |

* Trust receipts.

### St. Louis. March 5.

CLOSING PRICES.

| COMPANY. | Bid. | Asked. |
|---|---|---|
| Adams, Colo. | $ .60 | $ .75 |
| American & Nettie. | 1.15 | 1.25 |
| Anderson | .... | .... |
| Aztec, N. Mex. | .22½ | .30 |
| Bi-Metallic | 28.50 | 29.00 |
| Black Oak, Cal. | .01½ | .02 |
| Black Spar | .... | .... |
| Bremen | .03 | .03½ |
| Buckskin | .05½ | .06½ |
| Carriboo, Idaho | .... | .... |
| Central Silver | .21¼ | .23½ |
| Cleveland, Colo. | .... | .05 |
| Cleveland, Idaho | .36¼ | .40 |
| Cœur d'Alene | .80 | 1.00 |
| Dinero, Colo. | .... | .... |
| Golden Era, Mont. | .02 | .... |
| Golden King | .11 | .13 |
| Gold Run | .01 | .01½ |
| Granite Mountain, Mont. | .... | .... |
| Hope, Mont | .... | .... |
| Ingram | .70 | .... |
| Iron Clad | .... | .... |
| Ivanhoe, Colo. | .... | .... |
| I. X. L., Colo. | .06 | .... |
| Keystone | .03½ | .04 |
| La Union | .16¼ | .17½ |
| Little Giant | .03½ | .... |
| Major Budd, Mont. | .18¾ | .20 |
| Mexican Imp., Mex. | .10 | .... |
| Michael Breen | .67½ | .70 |
| Montrose Placer, Colo. | .... | .45 |
| Mountain Key | .61¼ | .63¾ |
| Mountain Lion | .08¾ | .09 |
| Neath, Colo. | .10 | .11 |
| Old Colony | .... | .... |
| Old Jesuit | .... | .01 |
| Pat Murphy, Colo. | .10 | .10½ |
| Pedro | .02 | .02½ |
| Phillips, Colo. | .... | .... |
| Pine Grove, Idaho | .06 | .06¼ |
| Queen of the West, Idaho | .08¼ | .10 |
| Raspberry, Mont. | .04½ | .... |
| San Francisco, Mont. | .03 | .04 |
| Silver Age, Colo. | 1.25 | .... |
| Silver Bell | .... | .... |
| Small Hopes, Colo. | .90 | 1.05 |
| Tourtelotte, Colo. | .06¾ | .07 |
| West Granite, Mont. | .... | .... |
| Wire Patch | .12½ | .18¾ |
| Yuma, Ariz. | .51¼ | .53¾ |

### Trust Stocks. March 7.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

| | | |
|---|---|---|
| American Cotton Oil, old | $35 | @$ |
| *American Cotton Oil. new | 27 | @ 27½ |
| Cattle Trust | .... | @ 15 |
| Distillers' & Cattle Feeders'. | 37 | @ 37½ |
| Linseed Oil | .... | @ 44¼ |
| National Lead | 18 | @ 18¼ |
| Natural Gas | 125 | @ .... |
| Standard Oil | .... | @166½ |
| Sugar Refineries | 67½ | @ 68 |

*These are the American Cotton Oil Central Trust Co.'s receipts and are known as new, and represent the old certificates which have been deposited in the Central Trust Co. in furtherance of the reorganization plan—from a trust to a corporation.

### Foreign Quotations.

#### London.

| COMPANY. | Highest. | Lowest. |
|---|---|---|
| Almada, Mex. | 1s 6d. | 1s. |
| Amador, Cal. | 18s. | 16 . |
| Appalachian, N. C. | 1s. | 0d. |
| Canadian Phos. Canada. | £3⅛ | £1⅛ |
| Carlisle, N. Mex | 3s. | 2s. 6d. |
| Colorado, Colo. | 4s. | 3s. |
| Comstock, Utah | .... | .... |
| Condova | .... | .... |
| Cons. Esmeralda, Nev. | 4s. 6d. | 3s. 6d. |
| Denver Gold, Colo. | 1s. | 6d. |
| Dickens Custer, Idaho. | 3s. | 2s. 6d. |
| East Arevalo, Idaho. | 3s. | 2s. |
| Eberhardt, Nev | .... | ... |
| El Callao, Venezuela | .... | .... |
| Elmore, Idaho | 3s. 6d. | 3s. |
| Empire, Mont | .... | 6d. |
| Garfield, Nev. | 4s 6d. | 3s. 6d. |
| Jay Hawk Mont | 3s. 6d. | 2s. 6d. |
| Josephine, Cal | 4s. | 2s. |
| Kohinoor, Colo. | 2s.3d. | 1s. 9d. |
| La Luz, Mex. | 1s. 6d. | 1s. |
| La Trinidad, Mex. | .... | .... |
| La Valera, Mexico | 1¼s. | 1⅛s. |
| Montana Lt., Mont | £1¼ | £1 3-16 |
| New California. Colo. | 10s. | 9s. |
| New Consolidated | 1s. | 6d. |
| New Eberhardt, Nev. | 1s. | 6d. |
| New Emma, S., Utah | 2s. 3d. | 1s. 9d. |
| New Flagstaff, Utah | 2s. | 1s. 6d. |
| Newfoundland, N. F. | 3s. | 2s. |
| N. Gold Hill, N. C. | 1s. 3d. | 9d. |
| New Hoover Hill, N. C. | 1s. 6d. | 1s. |
| Old Lout. Colo. | £⅞ | £¾ |
| Palmarejo, Mex | 18s. | 17s. |
| Pinos Altos, Mex | 1 13-16s. | 1 11-16s. |
| Pittsburg Cons., Nev. | 2s. | 1s. |
| Richmond Con., Nev. | 1¾s. | 1½s. |
| Ruby&Dunderberg, Nev | 9d. | 3d. |
| Sam Christan, N. C. | 2s. 3d. | 1s. 9d. |
| Sierra Buttes. Cal. | 5s. | 4s. |
| " Plumas Eur. | 1 1-16s. | 15-16s. |
| Sonora, Mex. | 1s. | 6d. |
| Stanly, N. C | 3s. 6d. | 2s. 6d. |
| United Mexican, Mex. | 8s. | 6s. |
| U. S. Placer, Colo. | 3s. 9d. | 3s. 3d. |
| Viola Lt., Idaho | 2s. 3d. | 1s. 9d. |

Highest and lowest prices during the week ending Feb. 22d.

#### Paris.

| | Francs. | Francs. |
|---|---|---|
| Belmez, Spain | 676.00 | 676.00 |
| Callao, Venez. | 75.00 | 75.00 |
| Callao Bis, Venez. | 4.00 | 4.00 |
| East Oregon, Ore. | 10.50 | 10 50 |
| Forest Hill Divide, Cal | 180.00 | 180 00 |
| Golden River, Cal | 400.00 | 400.00 |
| " " parts | 65.00 | 65 00 |
| Lexington, Mont. | 135.00 | 135.00 |
| " parts | 4.25 | 4.25 |
| Ouray, Colo. | 10.00 | 10.00 |
| Rio Tinto, Spain | 375.00 | 375 00 |
| Tharsis, Spain | 115 00 | 115.00 |

Highest and lowest prices during the week ending Feb. 20th.

## CURRENT PRICES.

These quotations are for wholesale lots in New York.

### CHEMICALS AND MINERALS.

**Acid**—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18°, ℔ 100 lbs. 1.00@1.50
Muriatic, 20°, ℔ 100 lbs. 1.12½@1.75
Muriatic, 22° ℔ 100 lbs. 1.37½@2.00
Nitric, 36°, ℔ 100 lbs. 4.00@4.25
Nitric, 42°, ℔ 100 lbs. 6.00@6.25
Oxalic, ℔ 100 lbs. .6.50@10.50
Sulphuric, 60°, ℔ 100 lbs. 80@1.25
Sulphuric, 66°, ℔ 100 lbs. 1.00@1.75

**Alkali**—
Refined, 48 p. c. 1.50@1.55
Refined, 58°. 1.40@1.45

**Alum**—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1¾@2
Lump. ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton. £4 10

**Aqua Ammonia**—18°, ℔ lb. 4¾
20°, ℔ lb. 6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11

**Ammonia**—Sul., ℔ 100 lbs. 3.15
Carb., per lb. 7½@8½

**Arsenic**—White, powdered, ℔ lb. 3¼@3½
Red. ℔ lb. 5¾@6¾
White, at Plymouth, ℔ ton. £12 2 6d.

**Asbestos**—Am., p. ton. $50@$300
Italian, p. ton, c. i. f. L'pool. £18@£60

**Asphaltum**—P. ton 13.00
Prime Cuban, ℔ lb. 4½@5½c
Hard Cuban, ℔ ton. $28.00
Trinidad. refined, ℔ ton. $30.00

**Barytes**—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19½@21.50
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f.o.b. L'pool, ton £6
No. 1, casks, Runcorn " " £4 10 0
No 2, bags, Runcorn " " 3 15 0

**Bleach**—Over 35 p.c., ℔ lb. 1.70@1.75

**Borax**—Refined, ℔ lb. 9½@9⅝
Concentrated. 7¾@8⅝
Refined at Liverpool, ℔ ton. £29

**Brimstone**—*See Sulphur.*

**Bromine**—℔ lb. 37@38

**Chalk**—℔ ton. 1.75
Precipitated, ℔ lb. 4¾@5

**China Clay**—English, ℔ ton 13.50@18.50
Southern, ℔ ton. 13.50

**Chrome Yellow**—℔ lb. 10@25

**Cobalt**—Oxide, ℔ lb. 2.60@2.90

**Copper**—Sulph. English Wks, ton £20@£21

**Copperas**—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks £1 15s.

**Cream of Tartar**—Am. 99% 22½
Powdered, 99 p. c. 23

**Emery**—Grain, ℔ lb. 4½@5
Flour, ℔ lb 2¾@3½

**Feldspar**—Ground, ℔ ton. 15.00

**Fuller's Earth**—Lump, ℔ bbl. .90@.95
Powdered, ℔ lb. 1⅞@2

**Gypsum**—Calcined, ℔ bbl. 1.25@1.50

**Iodine**—Resublimed. 2.75

**Kainit**—℔ ton. 10.00

**Kaolin**—*See China Clay.*

**Lead**—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7½
White, English, ℔ lb 8½@8¾
Acetate, or sugar of, white 12@13

**Lime Acetate**—Amer. Brown. .95@1.00
" Gray 1.75@1.87½

**Litharge**—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb. .9@9½

**Magnesite**—Greek, ℔ ton. 20.00

**Manganese**—Crude, per unit. .23@.28
Oxide, ground, per lb. 2½@6½

**Mercuric-Chloride**—(*Corrosive Sublimate*) ℔ lb. .70@.72

**Mineral Wool**,—℔ lb. 2

**Mica**—In sheets according to size,
1st quality, ℔ lb. .25@$6.00

**Ochre**—Yellow, "B. F.," ℔ ton, f.o.b. mill 30.00
"J. F. L. S.," ℔ lb. ex dock 2½

**Phosphate Rock**—S. Carolina, per ton i. o. b. Charleston. 5.75@7.00
Ground, ex vessel New York. 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton. 16.00

**Phosphorus**—℔ lb. .70@.75

**Plumbago**—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7

**Potassium**—Cyanide, ℔ lb. .39@40
Bromide, ℔ lb. 33
Chlorate, ℔ lb. 13@10
Carb. ℔ lb. 4.70@5.54
Caustic, ℔ lb. 7¼@8
Iodide. 2.65@2.70
Muriate, ℔ 100 lbs. 1.80
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb. 10½@11
Sulphate, ℔ 100 lbs. 2.30@2 35
Yellow Prussiate, ℔ lb. 17½@18
Red Prussiate, ℔ lb. 42@45

**Pumice Stone**—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered. pure, ℔ lb. 2¼@2½

**Pyrites**—Non-cupreous, p. units 10d

**Quartz**—Ground, ℔ ton. 14.00@16.00

**Rotten Stone**—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 6@10

**Salt**—Liverpool, ground ℔ sack. 75@80
Turk's Island, ℔ bush. .25@28

**Salt Cake**—℔ lb. .60@62½

**Saltpeter**—Crude, ℔ lb. 5¼@5½
Refined, ℔ lb. 6@8

**Soda Ash**—Carb., 48 % 100 ℔. 1.45
Caustic, 48 % 1.30
Soda Caustic, 60% 2.50
" " 70% 2.27½@2.35
" " 74-0% 2.27½@2 35

**Sal, English**, ℔ 100 lbs. 1.00
Sal, American, ℔ 100 lbs. .90
Nitrate, 100 lbs. 1.90@1.95

**Strontium**—Nitrate ℔ lb. 9@9¼

**Sulphur**—Roll, ℔ lb. 1¾
Flour, ℔ lb. 2
Crude Brimstone, 2s., ℔ ton. 19.50
Crude Brimstone, 3ds, ℔ ton. 19 00

**Talc**—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton. $18@$20
c. i. f. Liverpool, ℔ ton. £4 5

**Vermillion**—American, ℔ lb. 61
English, ℔ lb. 82@85

**Vitriol**—(Blue), Ordinary, ℔ lb. 5½@5⅝
Extra, ℔ lb. 7

**Zinc Oxide**—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb. 6½@7
* Spot.

### THE RARER METALS.

**Aluminum**—(Metallic), ℔ lb. $2.@$2.50
Sheet, per lb. 2.50

**Arsenic**—(Metallic), per lb. .40

**Barium**—(Metallic), per gram. $4.00

**Bismuth**—(Metallic), per lb. 2.75

**Cadmium**—(Metallic), per lb. 1.00

**Calcium**—(Metallic), per gram. 10.00

**Cerium**—(Metallic), per gram. 7.50

**Chromium**—(Metallic), per gram 1.00

**Cobalt**—(Metallic), per lb. 6.00

**Didymium**—(Metallic), per gram 9.00

**Erbium**—(Metallic), per gram. 7.50

**Gallium**—(Metallic), per gram. 140.00

**Glucinum**—(Metallic) per gram. 12.00

**Indium**—(Metallic), per gram. 9.00

**Iridium**—(Metallic), per oz. 7.00

**Lanthanum**—(Metallic), per gr. 10.00

**Lithium**—(Metallic), per gram. 10.00

**Magnesium**—Per lb. 4.50

**Manganese**—Metallic, per lb. 1.10
Chem. pure, per oz. 10.00

**Molybdenum**—(Metallic), per gm. .50

**Niobium**—(Metallic), per gram. 5.00

**Osmium**—(Metallic), per oz. 65.00

**Palladium**—(Metallic), per oz. 35.00

**Platinum**—(Metallic), per oz. 9.00

**Potassium**—Metallic, per lb. 28.00

**Rhodium**—(Metallic), per gram. 5.00

**Ruthenium**—(Metallic), per gm. 5.50

**Rubidium**—(Metallic), per gram 2.00

**Selenium**—(Metallic), per oz. 1.80

**Sodium**—(Metallic) per lb. 2.50

**Strontium** (Metallic), per gm. .60

**Tantallum**—(Metallic) per gram 9.00

**Telurium**—(Metallic) per lb. 5.00

**Thallium**—(Metallic) per gram .25

**Titanium**—(Metallic) per gram. 2.25

**Thorium**—(Metallic) per gram. 17.00

**Tungsten**—(Metallic) per oz. 2.25

**Uranium**—(Metallic), per lb. 5.00

**Vanadium**—(Metallic), per gm. 22.00

**Yttrium**—(Metallic), per gram. 9.00

**Zirconium**—(Metallic), per oz. 65.00

### BUILDING MATERIAL.

**Bricks**—Pale, ℔ 1,000 3 25@3.50
Jerseys, ℔ 1,000 5.50@6 50
Up Rivers, ℔ 1000 6 00@6.50
Haverstraw seconds, ℔ 1000. 6.25@6.50
Haverstraw firsts ℔ 1,000. 6.50@7.00
Fronts, nominal, ℔ 1000.
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore

**Building Stone**—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu.ft. .45@1.25
Granite, Scotch ℔ cu ft. 1.00@1.15

**Cement**—Rosendale, ℔ bbl .85@1.10
Portland, American, ℔ bbl. 2 15@2.45
Portland, foreign, ℔ bbl. 2.30@2.40
Portland, " special brands. 2.45@2.75
Roman, ℔ bbl. 2.65@2.85
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.00@8.25

**Slate**—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black, roofing, ℔ 100 sq. ft. 4.25@5.50

**Lime**—Rockland, common ℔ bbl. 1.00
Rockland, finishing, ℔ bbl. 1.20
St. John, com. and finish, ℔ bbl. .90@.95
Glens Falls, com. and fin., ℔ bbl .85@1.10

**Labor**—Ordinary, ℔ day. 1.50@2.00
Masons, ℔ day. 4.00
Plasterers, ℔ day. 4.00
Carpenters, ℔ day. 3.50
Plumbers, ℔ day. 3.50
Painters, ℔ day. 2.50@3.50
Stonesetters, ℔ day. 3.50@4.00
Tilelayers, ℔ day. 3.50@4.50
Bricklayers, ℔ day. 4 00

**THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.**